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WILLIAM HARVEY: THE MAN AND HIS TIMES.[1]

By HARVEY SUTTON, O.B.E., M.D. (Melbourne), B.Sc., D.P.H. (Oxon.),
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TONIGHT we celebrate the tercentenary of the publication of the masterpiece of William Harvey in which he set out the discovery of the circulation of the blood. My duty is to furnish an introduction to those who follow, and who will deal more fully with the philosophical and medical associations of Harvey's work, and to present a picture of the man and his times, especially at the universities. It is difficult to construct a biographical notice when no contemporary effort exists, but we are fortunate in that Harvey lived in the time of Shakespeare and to most of us the picture of Tudor and Stuart life which is presented in his immortal plays, is thoroughly familiar.

Harvey's life may be divided into three epochs, roughly corresponding to the reigns of Queen Elizabeth, King James I of England and King Charles I. Queen Elizabeth died in the year 1603 between Harvey's graduation at Padua and his attaining the degree of M.D. in London in 1604. His research work on circulation took place during the reign of James I, for the manuscript description was made in 1616 and his book published in 1628. King James I died in 1625. After 1629 on his appointment as Physician in Ordinary to Charles I he seems to have been closely attached to the Court and to have taken many journeys both to Scotland and on the Continent with either the King or his friends. Once an investigator, always an investigator and even during his Court period he still carried on studies on the chicken embryo, the details of which were luckily handed to Dr. Ent, and on morbid anatomy, the manuscript of which probably was destroyed in the sacking of his house by the Roundheads in 1642. We have no record of his childhood beyond the fact that he entered King's College School, Canterbury, when ten years old in 1588.

"Happy is the man that has no history" and like Shakespeare biographical details about Harvey are scanty.

To understand Elizabethan England it is necessary to go back about 250 years to the Black Death, our greatest national catastrophe. This visited England in 1348-1349 and swept off nearly half its inhabitants, reducing the population of over four millions to two and a half millions. This oriental disease of rats entered Europe at Venice, the great seaport at that time for the east, and spread throughout Europe. Mediaeval uncleanliness kept it alive to show up in years of bad harvests, till its last dramatic appearance in 1666 as the Plague of London in Charles II's reign. It took the population at least a century to recover its original figure and even in Elizabeth's reign it is doubtful whether the population exceeded five millions or less than the Commonwealth of Australia today. This appalling disaster in Edward III's' reign dealt a death blow at the whole social system. From that time we may date the end of the feudal period, the development of the English language as the mother tongue in place of Norman French, of the birth of the national literature; we see an increase in the power of Parliament, emancipation of the villein and the yeoman farmer with the sailor took the place of the serf; the English nation emerges. The reduced population gave a great stimulus to cloth making and a considerable export of raw wool to Italy and Flanders constituted much of the wealth of England. In population and in primary products we can see a close analogy to Australia of the present day. Religious intolerance in France and Flanders drove many weavers across to England in Tudor and Stuart times and weaving became a national industry. Prosperity came to the countryside and fine churches and well built stone Tudor houses still remain to show its effects. The seamen of London and other seaports, for no part of England is more than seventy miles from the sea, were adventuring to find new markets for these products across the ocean. Constantinople, at war with Catholic Europe, welcomed the heretic and the Levant, in spite of Barbary pirates and Spanish and Portuguese warships, was familiar to English vessels. The Dutch held the spice and pepper trade from the east and so there were formed companies to break up these monopolies, the East India Company and the Turkey merchants being examples. Attempts to find the north-east passage brought us in touch with the Czar; the search for the north-west passage led to the formation of the Hudson Bay Company. The British Empire was the inevitable consequence of these merchant adventurers who sought pepper for the Englishman's breakfast and a world market for his goods.

Harvey's brothers were turkey merchants and it is possible that Harvey can claim as an ancestor Sir Walter Hervey, Mayor of London, 1272, pepperer, a guild which later became the Grocers' Company, which later under Gresham's' guidance and the founding of the Royal Exchange in no small measure assisted Elizabeth in her scanty finances with a total in the Armada year of about half a million pounds. His father, Thomas Harvey, was Alderman and later Mayor of Folkestone and lived in a solid stone Tudor house. He was the financial genius of the family and died in 1623 in London, five years before the publication of his son's great work, but no doubt he was well aware of his son's discovery on which William Harvey had been at work for at least seven years previously. As a baby William would have been christened with a white cloth on his head and presented with twelve apostle spoons, while at the Gossips' Feast all sorts of sweets would be provided for the ladies, who did not hesitate to take away any surplus. To protect him against the evil eye and witches he would wear amulets. The house in which he was brought up, was built in two stories, the bedrooms being upstairs, the bed itself a flock mattress and

[1] Read at a meeting of the New South Wales Branch of the British Medical Association in conjunction with the Section of Medical Literature and History on July 26, 1928.

pillows instead of a straw pallet, sheet and round log for a pillow. Elizabethan children were very strictly brought up. The boy would say grace, wait on his parents in ceremonial fashion and clear the table before eating his own meal. He was instructed in manners at the table, "not smacking of lip as commonly do hogs nor gnawing bones as it were dogs." Forks at this time were only a curiosity, Elizabeth being the first royal person to use them, hence napkins were provided for wiping the fingers and the boy was told to "blow not your nose upon the napkin where you should wipe your hand, but cleanse it in your hankerchers." Handkerchiefs were beginning to be known and as he grew older his instruction would be: "Nor imitate with Socrates to wipe thy snivelled nose upon thy cap as he would do, nor yet upon thy clothes." Baths were used only for medical treatment, while the rushes on the floor were only rarely changed. Chimneys had recently been introduced as a precaution against fires which previously were lit in the open hall and small many-paned glass windows admitted more light than the mediæval horn. In the matter of games the Elizabethan boy was well provided for. Many of the modern games were in existence. William Harvey would have learnt fencing, tennis, dancing, archery and pallemalle (golf) and when older would be able to hit the mark at at least 220 yards with the bow. The middle class also, as well as the nobility, engaged in hawking, hunting and coursing which were indulged in by both sexes. Beatrice sighs for "a hawk, a horse or a husband." Many sports, however, were rough, as indeed was the tendency of the times; bear-baiting was preferred to the theatre. James I prohibited bear-baiting on Sundays. Cock-fighting, too, was common. The memory of the young boy for the boundaries of his parish was often stimulated by a yearly perambulation when the boys were thrashed at certain parts of the boundary. Pageants and masques were greatly delighted in and on midsummer eve the lads and lasses jumped over the fire and Morris dances were held at Whitsuntide.

Not long before William Harvey went to school he must have been thrilled by the appearance of the Armada as it was driven up channel by the guns of Drake's mosquito fleet. The Spaniard still held to the ancient Roman method of boarding; Drake introduced the modern tradition of the ship as a floating battery. Folkestone, Harvey's home town, contributed its quota to the coastal defence of England. Before his admission to the Grammar School at Canterbury he would have learnt his A B C at home. It is singularly appropriate that Harvey should have attended this school of which Linacre was a pupil, and may be a medical tradition had been there established which may have influenced the bent of Harvey's genius even as a boy. It is doubtful if he were taught English at school, that language being generally ignored. He would certainly have learned Latin, grammar, arithmetic and probably Greek. At six in the morning came private study and preparation, then school, a short recess at nine, school ended for the morning about 11.15 when the first meal of the day was served as is the continental fashion today. School went in at one o'clock in the afternoon with recess at three, lessons finished at 5.30 and psalms and prayers lasted till six o'clock; a twelve-hour day with practically ten hours in school. The discipline was severe; it is said of one teacher that he used to get himself warm in the morning by flogging a few boys and boys ran away from Eton because of the scourging. Ascham in 1570 shows the extent of this practice by his criticism of corporal punishment and Locke later condemned it in 1660.

Harvey at Cambridge.

The University of Cambridge at that time practically corresponded to the present high school and an arts degree and so Harvey at the age of sixteen years was admitted a lesser pensioner at the scholars' table the last day of May, 1593, at Caius College, Cambridge. Dr. Caius, 1510-1573, after a brilliant career at Cambridge, studied at Padua under Vesalius and became a professor there. Returning to England he became Physician both to Mary and Elizabeth and refounded his old college at Gonville Hall, changing its name to Gonville and Caius College. His love for symbolism displays itself in the design of the three great gates of Humility, Virtue and Honour. Inside the gates appear his arms: "two serpents erect, their tails nowed together and between them a book." On top of the gate of Honour was originally a weather-cock (a serpent and a dove). He left one side of the quadrangle, the sunny side, open, lest air confined within a narrow space should become foul and made special provision for "a lustie, healthie, honest, true and unmarried man of forty years and upwards to kepe cleane and swete the pavementes." It became a great medical college in the future. Caius obtained for it the right to dissect two bodies yearly and it is probably that the college attracted Harvey and perhaps inspired him to select medicine as his vocation.

We have practically no records of Harvey's career at Cambridge, though many of the buildings then extant can still be seen today, such as that masterpiece of architecture, King's College Chapel (Henry VI), the gateway of Trinity College (Henry VIII, 1546) and the gateway of St. John's College.

His general education having been completed, Harvey began his medical studies at Padua. Italy, at this time, was the leader of fashion: "Proud Italy whose manners still our tardy apish nation limps after in base imitation."

Harvey at Padua.

Padua with other north Italian universities, led the medical world at this time and held its pre-eminence for at least another sixty years. The Anatomy School where modern anatomy was founded by Vesalius was under the renowned Fabricius, born at Aquapendente in 1537. Living was cheap and many Englishmen were already there gathered together to form "a nation." Padua

further was under the strong and tolerant protection of Venice, the great seaport of the age, then in its heyday of renown, enhanced by the recent destruction of the Turkish fleet at Lepanto in 1571 and by their defiance of the Pope at this very time. Hence students from an heretic country such as England found there protection that was possibly lacking elsewhere. The University itself was a university of students as contrasted with Cambridge and Oxford where the masters of arts formed the governing body; the students had the say in the election of their own teachers and each nation had the power of electing a representative who, with the rectors, formed the senate or executive of the university. Really two universities existed, one formed by the aristocratic jurists, the richer and probably better educated, and that of the humanists. Although medicine was chiefly included in the latter, Harvey's status appears to have caused him to attach himself to the former. In 1600-1602 he was the representative of the English nation in the jurists' University and his *stemma* as councillor has been found in the University cloisters. The main university functions were conducted with great solemnity and ceremony and Fabricius himself wore a robe of purple and gold and was later presented with the golden collar of the Order of St. Mark. Harvey was the friend as well as the pupil of Fabricius and it was his discovery of the valves in the veins and his interest in the developing embryo of the chick that inspired Harvey to his great discoveries. Harvey's diploma dated April 25, 1602, is a remarkable testimonial to the esteem which his intelligence and skill had won for him. At Padua he must have met and studied under the famous Galileo and imbibed from him a more mathematical sense and a more exact appreciation of scientific method.

On his return to England he apparently continued his medical studies, taking out his M.D. (Cantab.) in 1602 at the age of twenty-four, and his membership of the Royal College of Physicians in October, 1604, becoming a Fellow in 1607 and attached to Saint Bartholomew's Hospital in 1608. His most important appointment, however, was that of Lumleian lecturer, which position he held from 1615 to 1656, where in the notes of the lectures on anatomy and surgery (1616) we find the first outline of his remarkable discovery which was published to the world twelve years later (1628). Harvey at this time is described as being not tall, but of the lowest stature, round faced, olivanter in complexion, with little, round eyes, very black and full of spirit; his hair black as a raven, though he became quite white twenty years before his death. In temper he is described as, like the rest of his brothers, very choleric and in his younger days he wore a dagger as the fashion then was, which he would be apt to draw out on every occasion, much like the gallants in Romeo and Juliet. His portraits give him an aspect of the highest intelligence, the index of a capable yet sensitive mind. He was apparently round-headed, like Shakespeare and Vesalius.

Aubrey states that "his practice suffered from the publication of his researches and that it was believed by the vulgar that he was crackbrained and all the physicians were against him; though all his profession would allow him to be an excellent anatomist I never heard any admire his therapeutic way. A man could hardly tell from his bills what he did aim at." (Possibly this may have been his illegible writing, a truly medical feature. Harvey's was so bad that he apparently had to act as his own proof reader.) His capacity of scientific detachment is well shown by the incident at the battle of Edgehill where, during the fighting, he read some books to the youthful princes only to be disturbed by round shot.

Harvey at Oxford.

After the battle of Edgehill in October, 1642, Oxford became the royalist headquarters. William Harvey was admitted as a Doctor of Physic at Oxford in 1642 and retired from Saint Bartholomew's in 1643. He was appointed Warden of Merton College in 1645-1646 until the surrender of Oxford and the retirement of the Court in June of that year. He was then sixty-eight years of age. His appointment was not inappropriate in that Merton College had a traditional scientific connexion and further Harvey would be familiar with its statutes for at his Cambridge college students lived according to the rules of the scholars of Merton at Oxford. Merton was the greatest college in Oxford and held pride of place in the Elizabethan times. Savile, its Warden, founded a professorship in geometry and astronomy so that "the multitude should no longer think that the most useful branches of mathematics were spells and her professors limbs of the devil." King Charles held his court in Christchurch and his queen, Henrietta Maria, near by in Merton. Oxford must have been a gay and stirring sight at this time. The Stuart student was no more obedient than the student at the present day. Laud, after perhaps his experience of communicants placing their hats and sticks on the communion table, forbade long hair, top boots and slashed doublets and all light and garish colours, together with the hunting of beasts with ferrets and the carrying of muskets, crossbows and falcons. He prohibited exhibitions without authority by rope dancers, actors and gladiators and proscribed football and knuckle bones. The penalty was corporal punishment if by reason of age it be becoming or fines, expulsion *et cetera*. Dr. Johnson says that John Milton was the last student to receive corporal punishment at Cambridge. The earlier years at the University practically represented the later years of secondary education nowadays.

During the royalist occupation the town was full of lords and all persons of best quality with very many ladies who when not pleased themselves, kept others from being so.

President Kettell, of Trinity College, flourished at this time, a very venerable person of gigantic aspect, with sharp grey eyes. He was very human, for he prevented Trinity students frequenting

taverns by seeing that the beer brewed in Trinity was the best. He refused to recognize the fashion of long hair in which the students imitated the Cavaliers and meeting an erring student one day near the kitchen he chopped the offending locks off with the bread knife. The ladies of the Court rather upset him for they attended divine service in the College chapel "half-dressed like angels," which much impressed the scholars, and strolled in the garden with their gallants who disturbed the President by playing to them on the lute. Two of these minxes who tried to vamp the crusty old dignitary, were dealt with very definitely. "Madam," he said to Mistress Fanshawe, "your husband and father I bred up here and I knew your grandfather. I know you to be a gentlewoman and I will not say you are a baggage, but get you gone for a very woman."

Amongst the buildings still extant which were in existence at this time, might be mentioned the chapel and tower of Merton College, the tower having been added in 1448, and the quaint old mediæval library with its chained books, founded in 1264 may still be seen. Almost next door is Corpus Christi College, founded 1516, with its famous sundial erected in 1605, which includes a perpetual calendar. Corpus was one of the first colleges to take up the teaching of "new learning." Close by is also Oriel College, founded in 1326 by Adam de Brom from a place called Oriole (the better ornamented recess of a building). Its royalist sympathies are shown by the statues of Charles I and Edward II in circular niches over the entrance to the hall, surrounded by a parapet which spells out *"Regnante Carolo."* A secret passage connected the queen's apartments at Merton with the king's court at Christchurch. At that time the well-known Tom Tower had not been completed, but the great quadrangle with its dining hall was erected about 1529, while on the adjacent side is the still older cathedral of the diocese of Oxford, which antedates the College and the University, whose main part was certainly in existence in 1180, while the original foundation may be over one thousand years old. Then there is the magnificent Tudor hall, one of the greatest in England, with its oak roof, 40 feet wide, 50 feet high and 115 feet long. Here dramatic representations, including plays of Shakespeare, were held for Elizabeth, Charles I and James I and at this very time when Harvey was in Oxford the royalist section of the Parliament held their sittings here. Its beautiful entrance stairway with fine tracery roof appears to have been due to the efforts of Dean Fell, just before the Civil War, 1640.

Other notable buildings at this time include Saint Mary le Virgin, the University church built in the thirteenth century, first in the perpendicular and the spire in the decorated perpendicular style, the well-known ball flower or pomegranate ornament being used in reference to Eleanor of Castile, the wife of Edward I and mother of Edward II, in whose reign the spire was completed. The porch with its spiral Italian columns was built in 1637 by the chaplain to Archbishop Laud. The figure of the virgin and child gave great offence to the Puritans, whose troopers took pot shots at the statue as they rode through in 1642.

Opposite Saint Mary's is All Souls' College, founded 1437, the College of all the souls of the faithful departed (including Henry V) who fell in the wars with France. Linacre, physician to Henry VIII and a pioneer of the classics, Sydenham, the English Hippocrates, and Christopher Wren, Fellow of the Royal Society, as well as architect, are associated with this college.

The University was intensely royalist in feeling. The college silver plate was melted down and minted; the arsenal was established at New College and the University trained bands exercised in the quadrangle and manned the city walls, portion of which still remains in New College garden. Here we see a curtain wall with an alure or walk on the top, protected by a parapet. The bastion was built in 1270 in the reign of Henry III and preserved by agreement by the founder, William of Wykeham, a great priest, but greater statesman and architect. He was the Rockefeller of his day, a great pluralist and he accumulated enormous wealth after the "Black Death." The dearth of priests which resulted from the plague, caused him to found a school at Winchester and a college at Oxford to supply the gaps in the clergy. He believed in plain living and hard thinking and introduced the tutorial system into Oxford. Amongst other ordinances he required the laundress to be of such age and condition that no sinister suspicion could or ought to fall upon her.

The University regiments took their parts in raids on the enemy, issuing out, perhaps with Prince Rupert, to gallop across the River Char on cavalry raids and returning to do their part in entertaining the ladies of the court.

Close by the entrance of the city is the famous Magdalen tower built about 1500 when Wolsey was Junior Bursar. It is 150 feet high and from its summit Charles I watched Fairfax's army marching around the north of Oxford. Still every first of May the choir welcomes the rising sun at 4.30 a.m. from the top of the tower, an old pagan ceremony. Opposite Magdalen is the Botanic Garden, the handsome gateway of which was designed by Inigo Jones in the rusticated Italian style, with statues later of Charles I and II. It, the first of its kind in England, was founded by the Earl of Danby in 1632, with a view especially to the Faculty of Medicine. One can quite believe that Harvey, with his recollections of the gardens of Padua, might have often spent a pleasant hour there.

And even during these troublous times we have evidence of his continued interest in the study of comparative anatomy. With the downfall of his royal master, Harvey appears to have retired from active social life, residing with one of his brothers, still taking an interest in professional *protégés* and patiently enduring attacks of the gout.

Harvey died on June 3, 1657, in his eightieth year. He had had many advantages in life, a thorough education, a freedom in practice from

worries, as Dr. Scot Skirving says, "of bills and babies," the friendship of many great minds in an age which favoured the spirit of inquiry and encouraged the rights of private judgement and the forces of free speculation. He lived in the golden age, but his genius carried him far beyond his contemporaries in science and in medicine. He carried with him the vision of the ancient freedom of Greek thought which now blossomed afresh, and revived once more the ideas and principles which that great teacher, Aristotle, whom Harvey revered and reintroduced into the world. He had the good fortune which few investigators have had of seeing the acceptance of his ideas in his own lifetime, as did Pasteur and Lister. In spite of his choleric temperament he won the esteem and friendship of his colleagues and lived harmoniously not only with his fellow practitioners, but in a court full of intrigue, in a time when casual opinion might have dangerous results. He attained that quality of *æquanimitas* and so justifies our admiration and our reverence. Above all he worshipped science and held that that worship should be in spirit and in truth.

WILLIAM HARVEY, M.D., F.R.C.P.: SOME ASPECTS OF HIS GENIUS.[1]

"I avow myself the partisan of truth alone."

By GUY GRIFFITHS, M.D. (Sydney),
Honorary Physician, Royal North Shore Hospital of Sydney.

WILLIAM HARVEY, the English physician and natural philosopher, was born in Kent in 1578. He was educated at Caius College, Cambridge, and afterwards at Padua, far beyond the sea, under Fabricius of Acquapendente. He took the degree of M.D. at Padua and also at Cambridge.

He settled in London and was elected Fellow and Lumleian Lecturer of the Royal College of Physicians of London and physician to Saint Bartholomew's Hospital: his practice grew and he prospered greatly. Among his patients was the Lord Chancellor, Francis Bacon.

For ten years he studied the anatomy and physiology of the heart and blood vessels, gave demonstrations and considered objections: at last in 1628, three hundred years ago, he published in fluent, lucid, eloquent Latin his "Motion of the Heart and Blood."

He was appointed physician to King James I and afterwards to King Charles I, who took a keen interest in his scientific work. So great confidence did Harvey's abilities and character inspire in the King that Charles entrusted the royal princes to his care during the battle of Edgehill and later appointed him Warden of Merton College, Oxford.

In 1651 he published his book on the reproduction of animals.

In his old age the Fellows of the Royal College of Physicians erected his statue in their hall and Harvey founded the oration in commemoration of benefactors which is still delivered annually in his name. He was invited to become president of the College, but his infirmities prevented his acceptance.

He died in 1657 in his eightieth year, full of honours and happy in the knowledge that his discovery was fully received and established.

During the dark ages men dared not think for themselves: what "Moses" or "Joshua" had said, was accepted without question. The first effect of the revival of learning was not to free men's minds, but only to add some classical writers to the list of indubitable authorities. Scientific matters were decided by the *ipse dixit* of Aristotle or of Galen.

It is to the credit of our profession that among the earliest to join Galileo in breaking the spell of authority and in appealing directly to Nature were the anatomists of the *cinquecento*. In their steps followed Harvey. He tells us:

> True philosophers . . . . eager for truth and knowledge . . . . welcome further information; . . . . nor do philosophers pin their faith to other's precepts . . . . they . . . . give credence to the conclusions of their proper senses.

And again:

> I would not have you, therefore, gentle reader, to take anything on trust from me. . . . I appeal to your own eyes as my witness and judge. For as all true science rests upon those principles which have their origin in the operation of the senses, particular care is to be taken that by repeated dissection the grounds of our present subject be fully established. . . . The method of investigating truth commonly pursued at this time, therefore, is to be held erroneous and almost foolish, in which so many inquire what others have said, and omit to ask whether the things themselves be actually so or not.

His doctrine denies caprice in the government of the universe and is based on the axiom of the uniformity of Nature.

Of this great truth, the guiding principle of all modern science, he was a bold and early exponent.

A second aspect of his genius is displayed in his book entitled *"Exercitationes de Generatione Animalium"* (1651), on ontogeny, that is the development of the individual.

About this subject two conjectures had obtained, scatulation and metamorphosis.

According to the former the bodies of successive generations were packed each within the next like a nest of boxes, but in endless series, that is the ovary of the mother contained a tiny miniature of the daughter and in the ovary of that tiny daughter was the still tinier miniature of her daughter, so that all the people living at the present were packed in infinitesimally tiny miniatures within the body of mother Eve.

Metamorphosis, the second conjecture about the reproduction of offspring, was that the young, though in its earliest stage a simple body unlike the parent, was suddenly, in the twinkling of an eye, transformed or metamorphosed to the likeness of the much larger adult into which it would grow in the course of years.

Harvey's researches disproved scatulation and metamorphosis; he reverted to the teaching of Aris-

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totle and substituted epigenesis, that is development by gradual differentiation of parts. He teaches that almost all animals, even those which bring forth their young alive, and man himself are produced from eggs; not merely *omne vivum ex vivo,* but *omne vivum ex ovo*; his actual words are *omnia omnino animalia, etiam vivipara, atque hominem adeo ipsum, ex ovo progigni*; and that as the egg or ovum grows larger its parts alter some one way and some another so that it slowly evolves into the adult form.

Lacking adequate optical instruments he could not demonstrate this for structures invisible to the naked eye, but for the structures of gross anatomy even of animals so high as deer he proved it conclusively. In the latter half of the eighteenth century C. F. Wolff elaborated this hypothesis and in 1827 von Baer gave the final proof by his discovery of the mammalian ovum.

The completed edifice of Harvey's doctrine of the evolution of each living being afforded the model for the development hypothesis of Herbert Spencer and of Charles Darwin, so that back to Harvey among others we may trace the theory of evolution of species.

Metchnikoff's work on the prolongation of life offers us a third example of inspiration from Harvey, this time in a minor way. When Metchnikoff noticed the long lives of Bulgarian peasants who drank much sour milk, he turned to Harvey's report on Thomas Parr, the famous old Parr said to have lived to be 152 years of age, and read: "His ordinary diet consisting of sub-rancid cheese and milk in every form, coarse and hard bread and small drink, generally sour whey"; thus he derived his sour milk treatment.

Another extract from the same report is not without interest, as it shows us the width of Harvey's purview.

> His wife, whom he had married as a widow in his hundred and twentieth year, did not deny that he had intercourse with her after the manner of other husbands with their wives, nor until about twelve years back had he ceased to embrace her frequently.

Yet another aspect of Harvey's genius had been displayed when in 1634 he presided over a board of ten midwives and seven surgeons to inquire into charges of witchcraft against four unfortunate old women of Lancashire. He found that they exhibited none of the corporal stigmata distinctive of witches. His compassionate temper united with his sound judgement to make him sceptical of the wisdom of such prosecutions, though enjoined alike by the religion and by the laws of the land.

His report procured the release of the accused and was an important factor in the slow purgation from our criminal code of the abominably cruel and—as it seems to us in these less illiberal days —incomprehensibly ridiculous statutes against sorcery.

Having considered Harvey's contributions in other fields of research, I turn now to his most celebrated achievement.

Before him many great men had investigated the vascular system and recognized that the blood moved, though they understood not how.

Galen knew that the blood moved to invigorate the body, but he thought it passed from the right side of the heart to the left through minute pores in the septum and that the blood stream flowed to and from the heart in the same channels.

Vesalius challenged authority and made profound anatomical researches which supplied a basis for further investigation.

In the period when Francis Bacon was able to take all knowledge for his province Michael Servetus studied theology and anatomy and in a work entitled *"Christianismi Restitutio"* described, though not without error, the passage of the blood from the right side of the heart through the lungs and back to the left side of the heart. His book was published in 1553, but it was seized and burned, some copies at Vienne with his effigy, the others, all save one or two, at Geneva with himself, by a persecuting Christian sect at the instigation of Calvin the devout, the famous reformer of Christianity. *"Tantum religio potuit suadere malorum"* had written Lucretius and well might Voltaire exclaim in righteous indignation: *"Écrasez l'infame!"*

Realdus Columbus of Cremona understood the action of the valves of the heart and the pulmonary circulation, but he denied the respiratory function of the lungs.

Andrea Cesalpino, of Arezzo, the famous botanist after whom is named the suborder *Cæsalpinieæ* of the *Leguminosæ* which contains some of our beautiful Australian flowering plants, advanced a stage further towards a recognition of the systemic circulation; he actually used the word *"circulatio,"* but though he caught glimpses of the truth, he did not escape serious error; he still believed that the septum was permeable and that the arteries ended in nerves.

Petrus Paulus Sarpi explained the function of the valves of the veins.

In the light of our modern knowledge it seems only another simple step to infer the circulation as we know it; but before Harvey it was not simple. His description of the circulation was received as something new and startling, nay, almost incredible by continental physicians who had not enjoyed the benefit of repeated demonstration and explanation vouchsafed to their English colleagues. Shakespeare tells us in the fable of the belly and the members ("Coriolanus," Act I, Scene I):

> Your most grave belly was deliberate,
> . . . . . and thus answered:
> "True it is my incorporate friends," quoth he,
> "That I receive the general food at first,
> Which you do live upon; and fit it is,
> Because I am the storehouse and the shop
> Of the whole body; but if you remember
> I send it through the rivers of your blood
> Even to the court, the heart, to the seat of the brain."

We must not allow ourselves to be misled by this or by similar statements scattered freely

through the literature of the day into supposing that the idea of the circulation was familiar.

Galen, Vesalius, Servetus, Columbus, Cæsalpinus, Sarpius, each had made and recorded valuable observations. One had a clear vision of this part of the subject, another of that, none of all. The full elucidation of the problem still escaped; important truths enunciated by some were contradicted by others; speculative notions overrode actual facts and the subject remained a heterogeneous mass of disconnected observations, of fantastic and inconsistent conjectures, of vague and ill-defined opinions.

Harvey, guided by his own numerous, laborious and exact observations and his ingenious and discriminating experiments on living animals, connected and coordinated all the facts, rejected the ludicrous errors and reduced the chaos to an orderly system. For an *anatomica imaginabilis* he substituted an *anatomica sensibilis*. He was the first to express clearly and fully the circulation of all blood through all the body. He showed that the heart was a muscular pump, that its contraction was the cause, not the effect of the movements, that the function of the lesser or pulmonary circulation was to purify and to aerate the blood and of the greater or systemic circulation to carry nourishment to the tissues, that the pulmonary and the systemic circulations coalesce to form one grand, continuous stream. He gave convincing proofs. He explained all difficulties, refuted all objections. In one point only he failed of direct demonstration; his microscope was too feeble to reveal the capillaries connecting the smallest arteries with the veins, but that there was such connexion he proved by exhaustive and drastically tested reasoning guided by cautious speculation. His reasoning includes a mathematical calculation in which he shows that the amount of blood pumped from the heart in a limited time is more than all the blood in the body; it must then be that the blood pumped earlier returns to the heart and is pumped again. This proof of the circulation set an example of the application of mathematical physics to physiology.

So complete was Harvey's demonstration that the Royal College of Physicians was won to his side and King Charles strove to surpass the honours already done to Harvey by his late father, King James.

Except for a few trifling errors Harvey's book may be used as a modern textbook. The distinguished French physiologist Flourens says of it: *"C'est un chef-d'œuvre; ce petit livre de cent pages est le plus beau livre de la physiologie."* Even Professor Luigi Luciani after a gross attack on Harvey for his alleged plagiarism at the expense of Luciani's countrymen bursts into this eulogy:

> Nevertheless Harvey's little book of 72 pages which came out at Frankfurt in 1628, *"Excitatio Anatomica de Motu Cordis et Sanguinis in Animalibus"* is undoubtedly the masterpiece of a man of genius.
>
> Even now after more than two and a half centuries of scientific discovery this *opusculum aureum*, as Haller termed it, arouses the admiration of the reader by its lucid ideas and the logical arrangement of its observations which were all founded on vivisection. With the exception of a few inaccuracies and errors everything it contains is well observed and reasoned and it may still serve as the introduction to a deeper study of this interesting subject.

We have formerly seen that Harvey was an early advocate of the fundamental axiom of science, that is the uniformity of Nature. Now we find him enunciating the most fruitful idea in biology, that the bodies of animals are natural engines. When men believed that their bodies were mere instruments for the manifestation of supernatural spirits, spirits which moved independently of the ordinary laws of physics and of chemistry, all was confusion, ignorance and superstition. The idea that the body is a machine comparable with, though much more complex than machines of human construction and working just as they do, is the fertilizing influence of all biological research. To this idea we owe all our knowledge of physiology and of pathology and all our therapeutic successes in medicine and in surgery. Well has Professor T. H. Huxley said:

> The discoveries of Galileo meant that the remotest parts of the universe were governed by mechanical laws, while those of Harvey meant that the same laws presided over the operations of that portion of the world which is nearest to us—namely, our bodily frame.

This theory, that the whole universe, organic as well as inorganic, is controlled by the inviolable laws of mechanics, is the source of all advance in science and of that amelioration of manners and that improvement of morals to which advance in science has invariably led.

HARVEY'S ENGLAND: 1578-1657. GLIMPSES OF THE TIMES, BOTH LAY AND MEDICAL.[1]

By L. COWLISHAW, M.B., Ch.M.,
Lindfield, New South Wales.

THE English medical journals published in May of this year have devoted much space to Harvey's life and to the consideration of the influence of his discovery on medical science.

This being so, it occurred to me that some interest might be found in an attempt to describe the England in which Harvey lived and travelled with King Charles during the civil wars, and the London in which he practised. To this I have added a few notes on some of Harvey's contemporaries, both lay and medical, some of them famous and some of them now well nigh forgotten.

Harvey's life of almost eighty years, from 1578 to 1657, occupied one of the greatest periods in English history. When he was born at Folkestone, Elizabeth had been on the throne for twenty years and he died within two years of the restoration of the Stuarts to the throne.

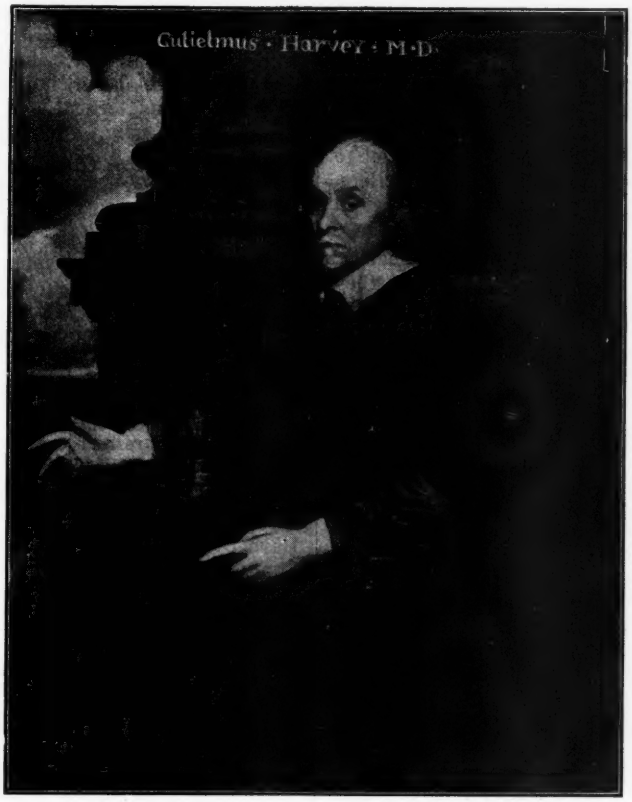
The England into which he came was ringing with the fame of the adventurous voyages of Sir Francis

[1] Read at a meeting of the New South Wales Branch of the British Medical Association in conjunction with the Section of Medical Literature and History on July 26, 1928.

Drake and within ten years his country was to pass through and emerge victoriously from one of the greatest crises in her history, in the defeat of the Spanish Armada.

We can picture the boy of ten watching with eager interest the preparations being made to fight the Spanish foe in his native town, which was one of the Cinque Ports, and we can see him climbing the steep white cliffs of Dover to catch a glimpse of the sea fights in the Channel which were to alter the history of the world.

I shall omit all reference to his school days at Canterbury, his student days at Padua and Oxford and pass on to his life in London.



Harvey came to London in 1603 and on May 4 he was examined at the Royal College of Physicians, for we read: "Mr. Harvie, doctor of medicine in the University of Padua, attended and presented himself for examination and when examined answered to all questions sufficiently well." He was examined the second time in 1604, the first year of James I. There were four other candidates, among them Thomas Lodge, who was afterwards to win fame as pirate and physician and as the author of the story "Rosalynde" which is the source of Shakespeare's play "As You Like It." Lodge failed to pass. Harvey was admitted to the Fellowship in 1607 and on the same day an old fellow student of his at Padua, Matthew Lister, was also admitted. The latter afterwards became physician to the Queen of James I.

Harvey was now established as a physician in London. He had married Elizabeth, daughter of Dr. Lancelot Browne, who was Queen Elizabeth's physician and who was an accomplished Arabic scholar. Harvey at first lived in the Parish of St. Martin's-extra-Ludgate. He had as his Rector the Samuel Purchas whom we all know as the compiler of those fascinating voyages and travels, Purchas's "Pilgrims."

Let us endeavour to form a mental picture of the London in which Harvey visited his patients.

The London of 1604 as you may see from the views on the screen was quite unlike the modern city. It was still surrounded by open country and the city itself had not yet been devastated by the Great Fire and rebuilt by our famous colleague Sir Christopher Wren, who studied medicine at Oxford before he took up architecture. Wren was an accomplished anatomist. The population of London has been estimated to have been in 1580 about 125,000 and by 1605 it had grown to 225,000. The accession of James I corresponds in time with the pretensions of London to be the first city in Europe. Dekker, the playwright in his book, "The Wonderfull Yeare. 1603, Wherein is Shewed the Picture of London, Lying Sicke of the Plague" says: "London was never in the highway to preferment till now. For she saw herself in better state than Jerusalem, she went more gallant than ever did Antwerp, was more courted by amorous and lustie suitors than Venice (the minion of Italy); more lofty towers stood about her temples than ever did about the beautiful forehead of Rome; Tyre and Sidon to her were like two thatcht houses to Theobalds, the grand Cairo but a hogsty."

Much of this is, of course, poetic licence, but London began to grow in Elizabeth's reign and grew even faster in that of James. But the growth of population was not followed by an improvement in sanitary conditions and we find that the streets were narrow, the houses for the most part of irregular design, built of half timber and plaster work, the poorer dwellings of timber, of clay and of mud mixed with straw.

Plague and other epidemics were ever present. One is apt to think of the Great Plague of 1665 as an isolated event, but if you dip into the pages of Creighton's "History of Epidemics" you will find that very few years were entirely free between 1580 and 1665 and that in 1603 and in 1635, 30,000 and 41,000 persons died of plague alone. In the comparatively free years 1606 to 1610 the average death rate was over two thousand.

This condition was largely brought about by the fact that no public services cleansed the streets—such efforts as were made in London were quite inadequate—or brought sanitation into the home. The water supply even in London itself was largely drawn from contaminated wells and from the Thames. As the population grew, it spread outside the old walled city which remained the centre of trade and commerce and the poorer classes were forced out and gradually there grew up slum areas in the so-called Liberties which were outside any civic control. In this area of suburbs the streets were merely quagmires and narrow alleys twisted and turned in an endless maze. It was in these areas that the outbreaks of Plague originated. "Death," says the author of the "Wonderfull Yeare," "had pitcht his tents in the sinfully polluted suburbs."

The roads surrounding London were hopeless. The constant passage of traffic kept churning the mud which was mixed with age-long accumulations of extraneous filth, disturbing as we are told, "even to the well-seasoned seventeenth century travellers, who were forced to stop their noses to avoid the ill smell occasioned by it."

The streets of the city itself were little better. Most of the main streets had been paved, but they were rough in the extreme and very filthy and one gentleman of the time complains bitterly of the damage done to his coach, "the stones being ready to shake it to pieces." The narrowness of the streets caused much delay to traffic and these stoppages led to wordy disputes between coachmen and carmen and sometimes led to bloodshed. In heavy rain the streets were converted into rushing streams.

The habit of throwing household refuse into the streets and the emptying of household slops recklessly must have rendered a stroll somewhat adventurous. The Paris of the day had nothing on London as to cleanliness if we are to believe Harvey's contemporary, the famous traveller Thomas Coryat, who says its streets "are the dirtiest and so consequently the most stinking of all that I ever saw in any city in my life."

In spite of these drawbacks life in Harvey's London must have had its pleasant aspects. The city was in close contact with the surrounding country and only a short walk would take one into the fields and on the north on the heights of Hampstead one would find oneself in a forest, while the marshy Thames flats were alive with wildfowl. One of the most delightful features of the city itself, the city within the walls, was the spacious garden attached to most of the ancient houses, many of which had been the old monasteries and religious establishments.

The citizen sitting in his living room or warehouse could hear the birds singing and on gazing without would see

> Where daisies pied and violets blue
> And lady-smocks all silver white,
> And cuckoo buds of yellow hue
> Do paint the meadows with delight.

As the city grew more crowded, the nobles migrated into more roomy surroundings in the country and this exodus made room for the busy artizans. Trades flourished. Commerce thrived and was stimulated by the new trade with the new found countries across the seas and the Thames became in the words of the antiquary Camden "a sure and most beautiful roade for shipping." The Thames was the chief highway of the London of this time and when nobles paid their visits of ceremony, they went by boat or barge. Merchants on business from wharf to wharf, from Paul's to the Tower or beyond used one of the wherries sculled by the Thames watermen, who became famous in the ballads of the time.

It has been said that the age produced its great man for almost every conceivable form of achievement: a great sailor, a great poet, a great physician and a great botanist, who was also a member of our profession. I will now tell you about the great botanist John Gerarde.

John Gerarde was born in 1545 and in 1597 he published the first edition of his "Herbal," and the second was revised and published by Johnson in 1633.

Gerarde was above all a gardener and his "Herbal" gripped the imagination of the English garden-loving world and after a lapse of three hundred years it still exerts its influence. Gerarde was a true lover of flowers. In his preface he says:

> What greater delight is there than to behold the earth apparelled with plants as with a robe of embroidered works, set with Orient pearls and garnished with great diversities of rare and costly jewels?

He is supposed to have studied medicine at an early age and he travelled in Russia, Denmark, Sweden and Poland and ultimately joined the Barber-Surgeons and had a large practice in London. His garden was famous throughout Europe; he tells us how full it was of "rarities," ranging from white thyme to the double flowering peach. Of his private life we know little beyond that his wife helped him in his work. He died in 1611.

Gerarde's faith in the efficacy of herbs to cure not only physical ills, but also those of the mind and even of the heart, is most touching. Sweet marjoram, he tells us, is for those "who are given to overmuch sighing." "If a garland of rosemarye be put about the head, it comforteth the brain, the memorie, the inward senses and comforteth the heart and maketh it merry."

Under Solomon's seal we find the following: "The root stamped while it is fresh and greene and applied taketh away in one night or two at the most any bruise, black or blew spots gotten by falls or women's wilfulnesse in stumbling upon their hasty husbands' fists or such like."

I could go on quoting from this delightful old book all the evening, but will pass on to say a few words about the other great English herbalist, John Parkinson, whose famous book was published the year after Harvey's *"De Motu."* Its title reads

"Paradisus in Sole, Paradisus Terrestris," and is a pun in Latin on its author's name. Of Parkinson himself, we know very little. He was born in 1567 and died in 1650 and his long life was spent as an apothecary in London and in his garden. He was a man of note in his time, was appointed Apothecary to James I and Botanist to Charles in 1629. He appears to have known all the leading men of his day and it is pleasant to think that Harvey may have walked in his garden and admired his recent acquisitions from overseas.

A few remarks as to the costume of the period may not be amiss. Harvey lived long enough to see the elaborate stiff Elizabethan costume with its monstrous wheeled farthingale and starched cuffs give place to the plain and sober costume of Puritan England.

The dress of the later years of Elizabeth had become stiffer and stiffer, more ungainly and more covered with ornament. The ruff began as a cambric collar and became larger and more pleated and wired. Special sticks were used to plait these ruffs, called poke-sticks. During the reign of James I there was very little change, but with Charles I came a sudden reaction. The dress is rich but simpler, the hair is long and the ruff has given place to a large laced collar and cuffs. Breeches were still full but no longer padded. With the advent of Cromwell, hats lost their feathers and heads were cropped and clothes, both for men and women, took on a sombre hue. The medical men of the time must have been much more impressive personages than their modern *confrères*. They visited their patients on horseback, accompanied by a manservant on foot. We read in Aubrey's life that Harvey "rode on horseback with a footcloth to visit his patients, his man still following on foot, which was very decent, now quite discontinued."

Elaborate and magnificent as was the costume of the better classes, their table manners could hardly be called refined.

An amusing sidelight on the table manners of the time can be obtained from a perusal of the old books on etiquette. It was customary to sit down at table with your hat on, removing it only if your health is toasted by "a person of quality" and you are advised to go to dinner with your hands clean. Apparently there was only one towel and you are requested to leave "a dry corner for the person who is to use it afterwards." You must spread your napkin over your knees and up to your chin and you may wipe your knife and spoon on it after every course, but the napkin is not to be used as a pocket-handkerchief, nor as a tooth-pick.

Wiping the face and scouring the plate with it were also tabooed. The first dish is a soup and there may be solids floating in it. If one of these burns your mouth badly, "make as little fuss over it as possible," remove it quietly, with your napkin over your mouth and pass it quickly behind your back "to the waiter."

Forks which, while not unknown in the XVI and XVII centuries, were rather admired as works of art than used as table essentials and in the absence of forks made it desirable that the guests who helped themselves with their fingers should wash their hands before coming to table.

Kings and queens, rich and poor, all thrust their hands into the platter and as one writer tells us: "There was but one point of difference between the tables of the great and those of the unlearned: at the former you advanced three fingers delicately to the dish and took a morsel quickly at hazard; at the latter you went a-hunting in the dish until you had made a prize of your favourite piece."

Certain rules for drinking were laid down which throw a lurid light on the habits of the time, when the common glass was often in use and in the early part of the seventeenth century only at the tables of the wealthy did every guest have his own glass; hence to leave a heel-tap was considered impolite!

Time will not permit me to quote more, but certain rules set down for the man of polish may be of interest.

Do not scratch yourself in company—a very necessary warning at a time when personal cleanliness was far removed from godliness. Do not blow in the soup. Do not return the meat to the dish after smelling it and finally do not pocket the fruit at dessert.

I shall draw a veil over the conditions of sanitary arrangements in private houses merely reminding you that it was in 1596 that Sir John Harison, the witty and graceless godson of Queen Elizabeth, to quote the words of Garrison, "introduced an important and indispensable improvement in sanitary engineering." He published his work the "Metamorphosis of Ajax" in 1596 and was banished from the Court for doing so, for the candour and outspokenness of his language is ultra Rabelaisian. If you wish to realize the deplorable condition of affairs up to quite recent times, I advise you to read the volumes of the Frenchmen, Cabanes and Franklin.

The habit of smoking had been well established in England by this time in spite of the fulminations of King James I in his "Counterblast to Tobacco" in which he calls on his subjects not to imitate the base Indians, slaves to the Spaniards, refuse to the world. Other writers such as Tobias Venner in his "Briefe and accurate Treatise concerning the fume of tobacco, which very many, in these dayes doe too licentiously use," published in 1621, upraid those who cannot travel without a pipe in their mouths, the habit causing, he says, "among other evils a trembling of the limbs, scotcheth the heart and drieth the brain."

Tobacco was first introduced into Europe as a medicine and only later became the solace and companion of fallen male and shall I say, female nature and at first marvellous healing qualities were ascribed to the herb.

Tobacco "an herb so generally received in the courts of princes, the chambers of nobles, the bowers of sweet ladies, the cabins of soldiers" was a novelty introduced into England in the reign of Queen Elizabeth. Tobacco is not mentioned by Shakespeare, but his friend Ben Jonson mentions it frequently. Stow in his "Chronicle" states clearly that tobacco was

first introduced into England in 1565 by Sir John Hawkins. Some fifteen years later the practice of "tobacco-drinking" became common, and one Bishop of London is said to have died of excessive tobacco-taking after the death of his wife. The story that it was introduced by Sir Walter Raleigh is not founded on fact; he no doubt by his example helped to make it fashionable at Court.

We are told that early in the reign of James there were at least seven thousand shops in London which sold tobacco. It was sold not only in special shops, but also in taverns, inns, alehouses and by apothecaries, grocers and chandlers.

Now, a few words as to the state of the medical profession in the seventeenth century. Before this time the regular medical profession, following the division of medicine into two parts, was split into physicians and surgeons. In the course of the seventeenth century a third grade arose. The apothecaries had won a separate charter and existence in 1617 and at first did not attempt to prescribe. They had no special training and no recognized status.

The name meant a storekeeper and by a statute of Henry VIII the censors of the Royal College of Physicians were to visit his shop and inspect the quality of his drugs. Later on he was permitted to open a vein in cases of pleurisy. Gradually he became the physician of the poorer citizens and performed a certain amount of minor surgery. The physicians and surgeons were intensely jealous of their new colleagues and numerous rules were drafted to let the apothecary know that "he meddle only in his vocation." He was to have two places in his shop, one most clean for physic and a baser place for the chirurgic stuff!

The surgeons on the other hand were not allowed to sell medicines and grocers were not allowed to keep apothecary shops. Shakespeare, Harvey's greatest contemporary, has left us a picture of the apothecary's shop in "Romeo and Juliet."

> In his needy shop a tortoise hung,
> An alligator stuff'd, and other skins
> Of ill-shaped fishes, and about his shelves
> A beggarly account of empty boxes,
> Green earthen pots, bladders, and musty seeds,
> Remnants of pack-thread and old cakes of roses
> Were thinly scattered to make up a show.

The immortal discovery of Harvey had little influence on the general practitioner of the time and medicine was a weird mixture of alchemy, astrology and superstition. As the century grew older, it grew more scientific, but during Harvey's lifetime there was a firm belief in such things as the "power of sympathy" of Sir Kenelm Digby which, like the "absent treatment" of modern Christian science, acted at a distance. Digby was a typical example of the nobleman who at this time dabbled in science, who, with all his learning, accomplished nothing of permanent value, yet that he played a leading part in the life of the age is proved by the following epitaph:

> Under this tomb the matchless Digby lies—
> Digby the great, the valiant, and the wise—
> This age's wonder for his noble parts,
> Skilled in six tongues and learned in all arts.

He is now only remembered for his eccentricities and the fame of his lovely wife, the Lady Venetia Stanley.

The belief in the influence of the stars on human destinies was carried to such an extreme that the curative effects of certain herbs were believed to be influenced by the planets. One of the leading exponents of this doctrine was Nicholas Culpeper, a fellow citizen of Harvey and the opponent of the College of Physicians. Culpeper was the son of a clergyman and after an apprenticeship to an apothecary set up in Spitalfields as an astrologer and herbalist. He brought down on his head the wrath of the Royal College of Physicians by translating the London Dispensatory from Latin into English. He enjoyed enormous popularity amongst the poor of London and his "Herbal" is still in demand as is proved by a recent edition.

Diseases, he says, vary according to the motions of the stars and he that would know the reason for the operations of the herbs, must look up as high as the stars. That Culpeper was unpopular with orthodox medical men is hardly surprising when we read his book. He speaks of them as "a company of proud, insulting, domineering doctors, whose wits were born above 500 years before themselves." He asks, "Is it handsome and well-beseeming a commonwealth to see a Doctor ride in State, in Plush with a footcloath, and not a grain of Wit but what was in print before he was born?"

Among Harvey's medical contemporaries, during the civil war, but fighting on the side of the Parliament, was the trooper physician Thomas Sydenham, the great reformer of practical medicine in England, but it is unlikely that Harvey and Sydenham ever met. On the side of the King was Richard Wiseman, surgeon to all the Stuart kings from Charles I to James II. He may be said to have been the greatest surgeon in England up to that time. Although there is no direct evidence, Harvey and he must have often met at Court even though Wiseman was only thirty-three when Harvey died.

The list of great men who lived during these times is so long that the mere mention of their names is impossible in the time at our disposal. One wonders if Harvey ever crossed the Thames and visited the Globe Playhouse and applauded the immortal Shakespeare and his band of actors. It is possible, for Shakespeare did not leave London until about 1609 and did not die until 1616. Twenty years before the *"Exercitatio"* was published, was born another great poet, John Milton, in a house of his father a scrivener near by Cheapside. Milton lived to see the Plague of 1665 and the Great Fire which followed it.

In the small town of Norwich lived and practised another writer of perfect English prose, Sir Thomas Browne, who with all his learning was yet deeply imbued with the superstitions of his times as witness his belief in witchcraft.

Among Harvey's contemporaries and his friend and medical attendant in his last illness was Sir Charles Scarburgh, a physician who played many parts in the life of the seventeenth century. Born

in 1616 he lived until 1694, was physician to several kings and queens and has left us a vivid description of the last illness of Charles II. During the civil wars he migrated to Oxford and entered Merton College, where Harvey was Warden. The friendship lasted until Harvey's death and Scarburgh helped him greatly with his book *"De Generatione Anumalium."* His portrait I can show you standing with his friend Edward Arris, whose name has come down to us in the Arris and Gale Lectures.

We have the following description of Scarburgh's costume. "He is dressed in the red gown, hood and cap of a Doctor of Physic and is in the act of speaking. On the left is another figure, the demonstrating surgeon, dressed in the livery gown of the City of London, whose business it was to handle and show the parts of the dissected bodies."

Scarburgh attended Harvey in his last illness and a rumour was spread that at Harvey's request he had given him his *quietus* in a draught of opium.

If you wish to learn more about this accomplished physician, our old friend Mr. Pepys of diary fame will tell you how he dined with him on board ship while they awaited the landing of Charles II.

Harvey, "that little perpetual movement," as the Earl of Arundel called him, was buried at Hempstead in Essex. In course of time his tomb became ruinous and the Royal College of Physicians in 1883 decided to reinter his remains in a marble sarcophagus inside the church. This was done in the presence of representatives of the Harvey family and the College and there the greatest Englishman who has adorned our profession, lies at rest. May I quote the words of the poet Abraham Cowley:

> Thus Harvey sought for truth in truth's own book
> Creation—which by God himself was writ;
> And wisely thought 'twas fit
> Not to read comments only upon it,
> But on th' original itself to look.
> Methinks in Art's great circle others stand
> Lock'd up together hand in hand:
> Everyone leads as he is led;
> The same bare path they tread,
> A dance like that of fairies, a fantastic round,
> With neither change of motion nor of ground.
> Had Harvey to this road confined his wit,
> His noble circle of the blood had been untrodden yet.

This concludes what I have to say this evening, a gathering of facts, anecdotes and pictures from many books, old and new.

I cannot lay claim to any originality, but perhaps I may be permitted to proffer the excuse put forward by one of the old herbalists in the preface to his book:

"For some of you will says, seynge that I graunte that I have gathered this discourse of so many writers, that I offer unto you an heape of other mennis laboures, and nothing of mine owne. To whom I answere, that if the honye that the bees gathere out of so manye floure of herbes, shrubbes, and trees, that are growing in other mennis medowes, felds and closes, maye justelye be called bees honye . . . So may I call it, that I have learned and gathered of manye good autores . . . my discourse."

THE RELATIVE LOW HUMIDITY OF THE ATMOSPHERE AND MUCH SUNSHINE, AS CAUSAL FACTOR FOR THE GREAT PREVALENCE OF SKIN CANCER IN AUSTRALIA.[1]

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THE title of my paper shows that there are three main points for discussion:

Firstly, relative low humidity of the atmosphere and much sunshine in Australia. This matter will be dealt with by the study of maps, kindly supplied to me by Mr. Hunt, Government Meteorologist of Victoria. I suggested low humidity as a *causa facta* in this matter of skin cancer in Australia as such a condition appeared to me to favour the solar rays in their irritating effect upon the skin.

Secondly, the great prevalence of skin cancer in Australia. This statement is proved by the opinions expressed upon this matter by dermatologists attending medical congresses held in Australia, and by an analysis of twenty thousand consecutive cases occurring in my practice during the last nineteen years.

Thirdly, that Number 2 is dependent upon Number 1.

At the International Congress of Dermatology held at Rome, 1912, I read a paper upon the peculiarities of skin diseases in Australia and *inter alia* drew attention to the great prevalence of skin cancer in this country. I suggested that probably the relative low humidity of the atmosphere in Australia favoured the irritating effects of the solar rays in the production of keratoses, rodent ulcer and epithelioma.

That the atmosphere of Australia is relatively low when compared with some other countries, is definitely shown, if you study the maps, kindly supplied to me by Mr. Hunt, Government Meteorologist of Victoria. These maps show that the humidity of the atmosphere of Australia is as low as 30%, 40%, 50%, 60% for the greater part of our continent and remains so for a great part of the year. If these maps are compared with similarly prepared maps of other countries inhabited by white people, one finds that the atmosphere of Australia is undoubtedly peculiar as regards its relatively low percentage of moisture. I mention white people, as in coloured races the pigmented skin is evidently able to protect itself against the solar rays. I do not know whether the Australian natives (aborigines) have ever shown evidence of skin cancer. It would be interesting to have the opinion of any medical man who has had experience in this matter.

In estimating the irritating effects of the skin likely to be due to the solar rays, one must also take into account the hours of sunshine and the time the skin is exposed to these rays. With regard to this matter Mr. Hunt has kindly supplied me with the following facts.

[1] Read at a meeting of the Victorian Branch of the British Medical Association on June 6, 1928.

How much more sunshine is experienced in Australia than the British Isles and New Zealand is strikingly shown by these figures:

	Average number of hours of sunshine per month.
Australian Capital Cities	199 hours
New Zealand (mean of seven stations)	178 hours
British Isles (mean of four stations) ..	120 hours

The figures for the individual capital cities are: Perth 232, Adelaide 211, Brisbane 219, Sydney 180, Melbourne 188, Hobart 161. It has to be borne in mind also that the sunshine increases towards the interior of Australia.

With regard to humidity the comparison is not so straightforward, because this element has a large diurnal range and the hours of observation were not the same in all countries. However, the humidity at 9 a.m. for the year mostly ranges from 80% to 84% in the British Isles, from 73% to 80% in New Zealand and from 63% to 69% in Australian capital cities. The individual figures for the latter are: Perth 63, Adelaide 53, Brisbane 68, Sydney 69, Melbourne 67 and Hobart 67 per cent. Again, as you know, the humidity decreases rapidly towards the interior of the continent.

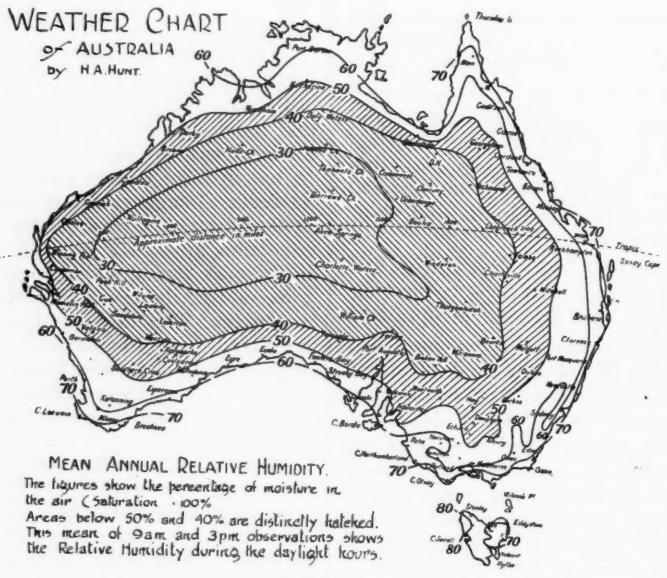


FIGURE I.

MAP A. This map shows relative humidity of the atmosphere of Australia for twelve months, illustrating the statement made by Dr. Herman Lawrence at Rome, 1912, that the relative low humidity of the atmosphere in Australia favoured the irritating effects of the sun's rays upon the skin and helped to account for the large number of cases of cancer of the skin occurring in Australia. British Isles humidity is 80-84%.

I would draw special attention to Mr. Hunt's remarks that the hours of sunshine increase towards the interior of Australia and likewise that the humidity decreases towards the interior of the continent. So that the conditions in Australia as regards these matters are really very much worse than the above figures suggest. At present our population exists chiefly in the great cities which are in the coastal area; what will happen when the population becomes more rural as regards the epithelial triad menace, is hard to predict.

Epithelial triad is a term I suggest for the three conditions, keratoses, rodent ulcer and epithelioma, as they occur in connexion with the subject under discussion.

These maps will appear in our medical journal and I think it would be interesting if dermatologists and others interested in this subject would keep a record of the districts from which their epithelial triad cases come. Of course a great number is in the capital cities, but if you question these patients, you will find that many of them have spent many years in the country districts. I have at present a patient with numerous keratoses, rodent ulcer of the head and epithelioma of the hand, whose history is that he has lived at Mackay, Queensland, for most of his life-time, but for a great number of years he used to journey inland about three hundred and fifty miles. These were business trips, taking about three weeks' time, and he would go at least four trips a year. He states that he always used to sunburn during these trips and his skin never pigmented. I have dark-skinned persons who have never lived outside Melbourne, with rodent ulcer and keratosis, just as one sees them in London, but I think the reason for the relatively large number of these cases in Australia as compared with the British Isles, is due to the cases to be traced to climatic conditions.

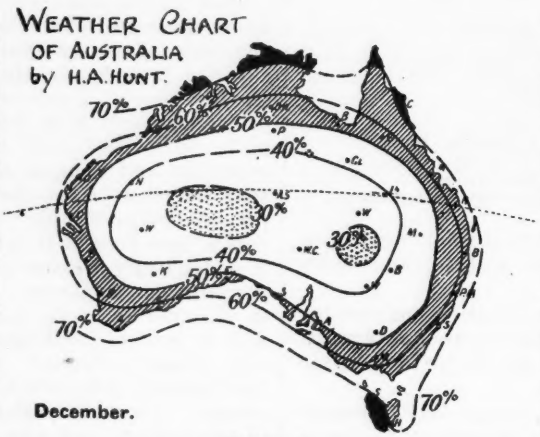


FIGURE II.

MAP B. This map shows humidity of the atmosphere of Australia for the month of December. The summer months are fairly similar in this respect. It would be interesting to mark on the maps the districts from which cases of the epithelial triad come.

The trouble with patients in the distant parts with early rodent ulcers or early epitheliomata is they find it difficult to go to one of the capital cities for radium treatment. The journey up, staying in the city and journey back take up three or four weeks of their time and some let the condition go on until it has reached a more or less incurable stage.

This trouble might be met by having a flying dermatologist, especially now the Federal Government has purchased such a large quantity of radium.

The flying dermatologist, carrying suitable radium kits for the treatment of these conditions, would fly to the different towns, having previously arranged with the doctor or doctors residing there an appointment, so that the epithelial triad patients of the district would be brought together for inspection and then the radium appliances, radium drops, needles, tubes and discs would be handed over with instructions as regards the different applicators, dosage *et cetera*. In these circumstances it would be advisable for the applicators to contain radium element and not emanation, as the dosage from the element is constant. On his return journey the flying dermatologist would pick up the applicators not required for the time being.

Prevalence of Epithelial Triad in Australia.

At medical congress meetings held in Australia, dermatologists have expressed the opinion that skin cancer is a very prevalent disease in this country and some have expressed the opinion that this disease is, relatively speaking, more common in Australia than in England or European countries where they have had the opportunity of studying skin diseases. My own experience certainly supports the above statements and I think from the figures I now bring under your notice, you will agree that this matter is a very important one.

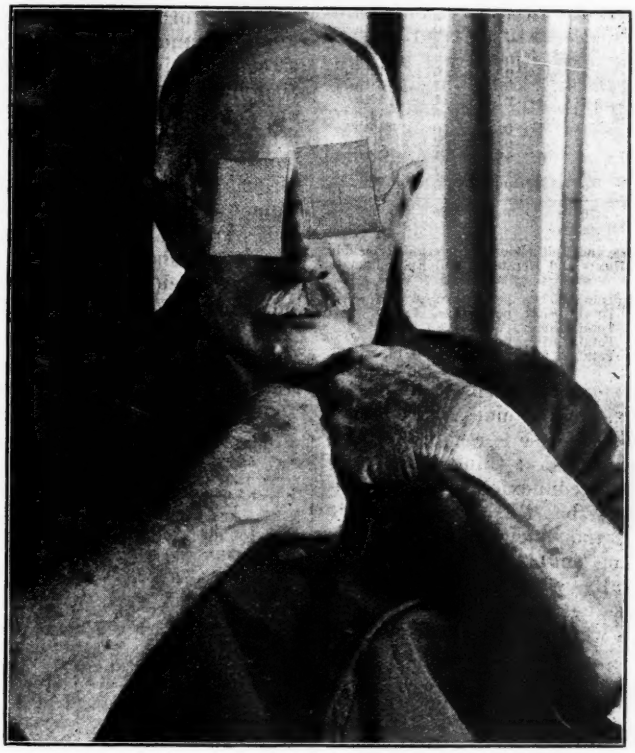


FIGURE III.

Photograph of Man with Keratoses, Rodent Ulcer of Scalp and Epithelioma of Back of Hand. This patient used to sunburn so severely that he would only tuck his sleeves up half way when at work. The keratoses are seen to be limited to the area exposed to the sun's rays.

Dr. R. C. E. Brodie has kindly made out an analysis of the last twenty thousand patients attending me in private practice during the years 1908 to 1927. The number of cases coming under the heading of the epithelial triad (keratosis, rodent ulcer and epitheliomata) is certainly suggestive that this condition of skin cancer is quite a serious matter in this country. The analysis of these patients is shown in the accompanying table.

You will notice that of rodent ulcer there are 1,374, that is 6·82%, keratosis 877 or 4·38% and epitheliomata 395 or 1·975%. Adding all these epithelial triad cases together, the total is 2,646, which gives a percentage of 13·23%.

Unfortunately I have not been able to obtain a similar analysis of cases occurring in the practice of a dermatologist in England or abroad for comparison. In the late Dr. Radcliffe Crocker's book there is an analysis of fifteen thousand consecutive cases, but as most of his work was carried out before X rays and radium were introduced into the domain of dermatology, it is quite impossible to make any comparison between the two sets of analyses.

Dr. Crocker's analysis gives only 48 rodent ulcers in 15,000 as against my 1,374 in 20,000.

Dr. Brodie has kindly made a graph showing the gradual increase in the number of cases of rodent ulcers and keratoses during the past twenty years. You will notice that of patients with rodent ulcers in 1908 there were 27‰ and of keratoses 19‰, whereas in 1926 there were 89 rodent ulcers per thousand and keratoses 82‰. Adding these figures together for rodent ulcers and keratoses, we find there were 46‰ in 1908 and 171‰ in 1926. As regards the columns showing the number of patients with rodent ulcers and keratoses and epithelioma and keratoses, one must not take them into account, as in recording my cases I generally only mention the chief trouble, which would be a rodent ulcer or epithelioma, as the case might be. As a matter of fact I have had many patients with all three conditions at the same time. One afternoon when demonstrating an exaggerated case of keratoses to students at the Saint Vincent's Hospital skin clinic, I drew attention to two small growths upon the right side of the neck. I diagnosed one as basal-celled epithelioma (rodent ulcer), perhaps better termed basal-celled carcinoma and the other as squamous-celled epithelioma. I excised these

growths and sent them to Dr. A. J. Brenan, Pathologist to the hospital, marked *A* and *B*. The result of the microscopical examination showed the diagnosis to be correct.

TABLE SHOWING ANALYSIS OF TWENTY THOUSAND CASES AND SETTING OUT THE NUMBERS OF RODENT ULCERS, KERATOSES, EPITHELIOMATA, AND LUPUS VULGARIS.

Rodent Ulcers.	Keratoses.	Epithelio-mata.	Rodent Ulcers and Keratoses.	Epithelio-mata and Keratoses.	Lupus Vulgaris.	Number of Thousand.
27	19	17	5	1	7	1st
36	22	24	4	0	4	2nd
41	24	17	1	0	2	3rd
50	53	9	4	0	2	4th
50	37	26	8	1	1	5th
61	43	19	2	1	0	6th
61	40	17	1	0	0	7th
59	39	18	3	1	2	8th
72	26	13	1	0	0	9th
72	44	30	4	1	1	10th
69	39	36	4	0	0	11th
78	31	20	4	0	0	12th
60	38	22	4	0	1	13th
76	49	28	3	2	1	14th
81	48	16	4	1	0	15th
88	49	24	1	0	0	16th
66	64	16	6	0	2	17th
79	61	14	2	0	1	18th
89	82	14	4	0	1	19th
89	69	7	5	0	5	20th
Totals1,304	877	387	70	8	30	

Totals of Rodent Ulcers, Keratoses, and Epitheliomata corrected to include numbers from the groups Rodent Ulcers and Keratoses, and Epitheliomata and Keratoses:

Rodent Ulcers	Total, 1,374;	percentage,	6·82.
Keratoses	Total, 877;	percentage,	4·38.
Epitheliomata	Total, 395;	percentage,	1·975.
Epithelial Triad	Total, 2,646;	percentage,	13·23.
Lupus Vulgaris	Total, 30;	percentage,	0·15.

I do not mention *dermatitis solaris chronica*, as this trouble generally has one or more of the triad conditions present and so the case is recorded under one or other of those headings. I think the figures I have brought forward in connexion with the epithelial triad trouble, show that this disease is very prevalent in Australia and one must take into consideration that I am only one of the many dermatologists in Australia who are treating these patients. At the congress held at Brisbane in 1920, the following resolutions were passed in the Section of Dermatology:

> (1) In the opinion of this section certain types of individual are constitutionally prone to skin cancer.
>
> (2) That climatic conditions in Australia favour the production of skin cancer in such persons.
>
> (3) Further, that certain measures of protection might be recommended.
>
> (4) And suggest that a Committee be appointed to report on the matter at the next Congress.

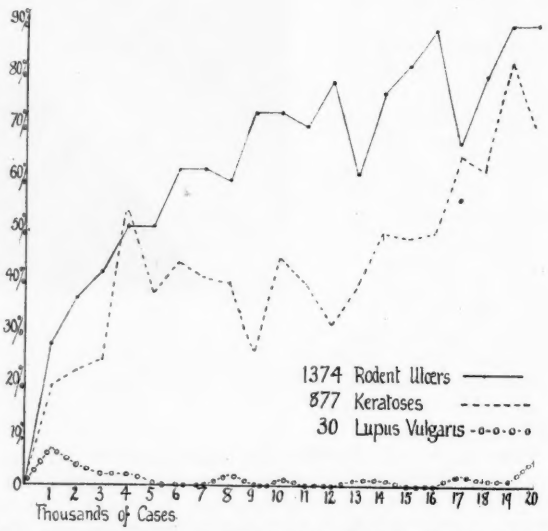
As a matter of fact the opinion of all the dermatologists present at that meeting (though not mentioned in the above resolutions) was that skin cancer is relatively more common in Australia than in other countries.

Of course, rodent ulcers and epithelioma are common conditions in most countries and their treatment *et cetera* is dealt with fully in our textbooks. But keratoses, especially *keratoses solares* and *dermatitis solaris chronica*, are probably the basis of our epithelial triad trouble in this country and their importance as precancerous conditions should not be overlooked.

That the lessened humidity of the atmosphere can allow the ultra-violet rays to have a greater irritating effect upon the skin has been proved by many experiments. I would refer to a book, just to hand, by Russ, Clark and Walters, "Physics in Medical Radiology," page 48, in which they state that: "Much more ultra-violet radiation is found at heights of 5,000 or 6,000 feet than at sea level, owing to its absorption by the atmosphere, especially by the dust and moisture in the air." Wing-Commander Wackett found the atmosphere so light in the Northern Territory that he could not carry sufficient petrol for undertaking a long journey, the atmosphere at sea level there being similar in density to the atmosphere at three thousand feet at Sydney.

If one, for instance, compares Adelaide, with 53% humidity and 211 hours of sunshine per month and a comparatively clear atmosphere, with London, 80% humidity and 120 hours of sunshine per month, one can readily understand that the solar rays have a much greater opportunity of producing skin irritations in the former city. And if you compare Broken Hill, Mount Gambier, Wilcannia, Bourke, Camooweal, Kalgoorlie, Coolgardie *et cetera* in the 40% to 50% area of humidity and with a still greater number of hours of sunshine, the conditions for the development of epithelial triad troubles are much worse even than at Adelaide.

Further evidence of the obstruction to the passage of ultra-violet rays through an atmosphere in accordance with the amount of moisture present will be found in papers by Fowle, carried out at Mount



Graph illustrating the number of cases of rodent ulcer, keratosis and *lupus vulgaris* occurring in each 1,000 consecutive dermatological conditions among a series of 20,000 patients over a period from 1908 to 1927.

Wilson, in the *Astro-Physical Journal*, Volume XXXVIII, 1913, page 392, and Volume XL, 1914, page 435. I have to thank Dr. Stuart Cross for these references.

These experiments show that the ultra-violet rays are impeded in accordance with the amount of moisture present in the atmosphere.

Hazen, of the United States of America, in his book "Skin Cancer," 1916, writing of the incidental factors in the causation of cancer of the skin, refers, *inter alia,* to light and states that:

> Hyde (*American Journal of the Medical Sciences*, 1906) has clearly shown that those who are most exposed to sunlight are the most apt to suffer from basal-celled carcinomata, the malignant growth being usually preceded by a keratosis.
>
> More recently Lawrence (International Dermatological Congress, Rome, 1912) has drawn attention to the prevalence of keratoses and cancer in the dry and sunny regions of Australia and entirely independently reaches the same conclusions as Hyde.
>
> He attributes the condition "to the great amount of sunshine and the low relative humidity of the atmosphere.

However, I do not agree with Hyde's statement above that the malignant growth is usually preceded by a keratosis. I think we must draw a distinction between *keratosis senilis* and *keratosis solaris.* Rodent ulcer may develope in or around about *keratosis senilis,* but the *keratoses solaris* often give rise to malignant epitheliomata.

Keratoses Produced by Ultra-violet Radiations.

That keratoses can be produced by ultra-violet radiations is definitely proven by the following statement:

> A patient, a young man, *ætatis* twenty-seven, consulted Dr. Keith Colquhoun for a skin trouble which was situated upon the body, back and front of chest and extending downwards. I had the opportunity of seeing this patient in consultation with Dr. Colquhoun and I quite agreed with his diagnosis that the condition was one of multiple keratoses evidently produced by numerous prolonged exposures to the ultra-violet rays. The exposures were half-hour treatments, back and front, twice a week for a year and a half. The treatment was not administered by a medical man. Dr. A. J. Brenan examined one of the horny formations, as depicted in the photograph and found hypertrophy of the horny layer of the epidermis, with definite parakeratosis and conditions supporting the diagnosis of keratosis. Looking at the photographs of the parts affected (see Figure IV) one thinks of *verruca senilis,* but of course the age of the patient and the biopsy do not support that diagnosis and I understand from Dr. Colquhoun that the condition is now gradually clearing up. The amount of treatment by the ultra-violet rays was so extraordinary that it is little wonder keratoses should have resulted in this case. I expect before very long we will see other cases of skin trouble due to maltreatment by these rays. Keratoses always develope in the skin upon parts constantly exposed to the sunlight; in this case they appeared in the skin covered by clothing and so not exposed to sunlight.

Keratosis.

The condition keratosis (κέρας, horn) is really an abnormal condition of the epidermis, due to some exciting factor which has interfered with the usual natural formation of the corneal layer of the epidermis. Books upon dermatology, written by leading men in England, give very little attention to this subject. They describe *keratosis follicularis* (Darier's disease), *keratosis pilaris,* so common upon the thighs and arms, *keratosis arsenicalis* and some other special keratotic conditions. Of course *keratosis senilis* receives some attention and the fact of the likelihood of these keratotic conditions becoming malignant is mentioned. Sequeira in the last edition of his book describes a condition of keratosis of the outer edge of the ears, for which he suggests the term *keratosis auriculare.* This last condition is quite common in Australia and I would place it as a *keratosis solaris,* as Sequeira mentions they are often quite painful and so very awkward in bed when both ears are affected. The reason this subject of keratosis receives so little attention by English dermatologists is, of course, due to the fact that the climate of England, the high degree of humidity, 80%, and the small amount of sunshine do not produce these irritative conditions (*keratosis solaris*) as we meet with them in Australia. Our climate, with a humidity as low as 40%, 50%, 60% and lower still towards the centre of the continent, together with the large amount of sunshine, favours the harmful effect of the solar rays upon the skin of persons in Australia exposed to these conditions, especially fair persons, whose skins have not the power to brown or form a protective pigmentation against the effect of the rays.

In America some of the writers give considerable attention to the subject of keratoses and what they call there "farmer's cancer." In some of the States of America the climatic conditions, as regards low humidity and long hours of sunshine, are somewhat similar to what we have in Australia. In these States in America there is apparently a similar condition as regards the correlation of skin cancer

FIGURE IV.
This is a photograph of a man, *ætatis* twenty-seven, with numerous keratoses due to exposures to ultra-violet rays, quartz lamp burner *et cetera.* The photograph was kindly lent by Dr. Colquhoun who states the condition is gradually disappearing.

and *lupus vulgaris* as occurs in this country, namely, great prevalence of the former and a scarcity of the latter. I think, if only on clinical grounds, we must draw a distinction between *keratosis senilis* and *keratosis solaris*. I believe Dr. Paul, of Sydney, was the first to apply the term *solaris* to certain keratoses and also to use the term *dermatitis solaris chronica*. I look upon these two conditions as playing the serious part in our Australian trouble. The likelihood of epithelioma (malignant) developing in these conditions is very great. I look upon *keratosis solaris* as developing earlier in life than *keratosis senilis* and that they have a greater tendency to develope upon the back of the hands, forearms and sides of the neck.

A keratosis varies in its formation and appearance according to the nature of the irritant which causes it to develope, also according to position or region of the body in which it developes.

A patient, a medical man, has three forms of keratoses upon his skin, namely *keratosis senilis* (face), keratosis (radium) of thumb and keratoses upon back of hands, due to chronic X ray dermatitis.

The keratosis (radium) is situated at the distal end of the thumb and is due to holding radium applicators, whilst preparing them for use, between the thumb of the left hand and index finger. This radium keratosis is in the form of a horn and is of a dense formation, dark in colour, being situated just under the free end of the nail. The X ray keratoses on the backs of the hands are small with adherent scaly formations and a tendency to become verrucose. Twenty years ago two of these keratoses developed what appeared to be malignant formations; they were hard and extended downwards. It was advised to have them excised, but I am inclined to look upon chronic X ray dermatitis of the skin as being in a somewhat similar condition to *dermatitis solaris chronica*, a condition in which surgical interference should not be practised, if other treatment can be successfully applied. The whole skin of the part affected is in an atrophic and precancerous state and there is a certain amount of protective fibrosis and I think it is inadvisable to open up the lymphatics in such a condition. The keratoses referred to in the above case disappeared with radium treatment and there has been no further trouble with them. It is now twenty years since they were treated.

Keratoses also vary in their clinical appearance, in accordance with the cutis reaction and nature of the skin in which they form.

Keratoses in a Kerotic Skin.

For instance keratoses forming in the skin of the face vary with the complexion or quality of the person's skin. In keratoses occurring in a kerotic skin (*κέρας*, horn, a term introduced by Darier for a coarse complexion skin) the skin is greasy and apparently thickened, the openings of the sebaceous follicles dilated. Keratoses in such a skin are generally brownish in colour, somewhat raised and have a greasy appearance, the exfoliating epidermic cells being mixed up with sebaceous matter and much adherent foreign material including dust and minute pieces of fabric material, microorganisms *et cetera*.

If you take a scraping of one of these keratoses and put it into a caustic potash solution and examine under the microscope, you will find conditions as just described. Frequently in these keratoses there are numbers of the *demodex follicularum* growing freely, the soil evidently suiting their development. On the other hand a keratosis forming in a good complexion, fair, soft, clear, fine skin, does not appear dark or greasy and a scraping examined microscopically gives chiefly epithelial cells and no demodex. In regard to the presence of the demodex, Borrel at the Pasteur Institute some years ago suggested demodex as a causative agent in the production of epithelioma. I have not read his paper, but probably he found conditions somewhat similar to what I have just described. Darier, in referring to the above statement, says that Borrel thought the demodex might possibly be the carrier of some unknown germs. Personally I look upon the demodex as taking part in the formation of pustules in a rosacea occurring in a kerotic skin. The demodex breaks through the barrier at the mouth of the follicle and carries pyogenic organisms into the follicle. Personally, I consider the demodex as pathogenic in the human being. At the congress at Rome I exhibited a moulage, representing the condition I called dermatitis, due to the *demodex folliculorum*. Dr. Whitfield, of London, some years afterwards, quite independently of my paper upon this subject, described a skin disease which he considered was produced by the demodex and which he called *demodex impetigo*. Dr. Whitfield kindly acknowledged my priority in disputing the textbook assertion that the *demodex folliculorum* is non-pathogenic in the human being. From a further study of demodex dermatitis I am inclined to the opinion that the demodex causing this trouble is not the variety usually found in man, but probably contracted from some other animal, as the dog.

My last case of demodex dermatitis occurred on the face of a young woman with a non-kerotic skin and so there was no definite exudation and the lesions did not appear impetiginous. There were eight lesions upon the left side of the face (unilateral), all lesions circular, three about the size of a threepenny piece which were covered with a dry crust, and several early blister-looking lesions about the size of split peas. All lesions gave numerous specimens of the demodex upon examination of scrapings of the lesions in caustic potash solution. This patient's skin, a clear, fine, dry complexion, was not the nature of the skin in which the human species of demodex would thrive.

I have made these few remarks upon the demodex, as I would be pleased if dermatologists would keep a lookout for such cases, as it would be interesting to know to what extent this disease occurs in this country.

Prevention.

We certainly cannot alter our climate, but we should endeavour to prevent if possible the apparent increase in the number of these cases in our community. In the *Empire Review* for March Dr. Leonard Williams states that the capacity for producing pigment varies greatly among individuals and races. Some white men, living in tropical climates, remain unchanged, while others resident for the same period return with dark hair and dusky skins. The French have studied this aspect of pigmentation and do not willingly accept blonde candidates for government service in hot climates, as they appear to have less resistance to torrid diseases than dark men.

Dr. Williams further states:

That there can be no doubt that dermic pigment is developed as a protection against certain deleterious rays of the solar spectrum and that failure to produce the necessary amount in each particular climate indicates a failure of adaptation to environment which is liable to have very grievous consequences.

And these grievous consequences in this country are evidenced by the large number of persons suffering with cancer of the skin.

The question arises whether the Commonwealth medical authorities should not follow the example set by France and be careful in accepting migrants for outdoor work in the low humidity areas of this country if they are hypersensitive to the sun's rays and do not have the power to form a protective pigmentation or browning of the skin. The hypersensitivity of the candidate's skin to the effects of the sun's rays might be judged by the effects of an exposure of the forearm to a test dosage of the ultra-violet rays from quartz lamp *et cetera*. If the skin reacts definitely, showing hypersensitivity and there is no attempt at pigmentation of the skin, when the inflammatory condition has cleared up, then the candidate would not be suitable for climatic conditions in certain parts of Australia.

Horns.

Cutaneous horns, though of epitheliomatous nature, were not included in the analysis of triad cases occurring in my practice. I should think that they are relatively more frequent in Australia than in Europe.

Lebert, quoted by Dr. Paul, states that 12% of horns become malignant; my experience would not place them at more than 1% or 2%. However, they are precancerous conditions and can be well treated by radium.

Small horns may be cut off with a pair of scissors, removing the protruding part from the skin, a radium drop is then applied for an hour. I have had my radium drops constructed so that one may use the hard β rays when required.

These radium drops are very useful in the treatment of corns, warts, keratoses and early rodent ulcer situated near the inner canthus. Large horns I crush off level with the skin with bone forceps and then apply stronger radium applicators in order to disintegrate the papillæ which form the base of these growths.

It is advisable to give an after treatment in these cases to prevent recurrence.

Xeroderma Pigmentosum.

Nearly all writers on the subject of skin cancer refer to the disease *xeroderma pigmentosum*, a very rare disease starting in early infancy with the appearance of freckles, telangiectases, atrophic spots, keratoses and later on in young adult life malignant growths develope and a fatal termination sooner or later ensues.

In these patients it is supposed that there is an inherited hypersensitivity as regards the skin and its sensitivity to the irritating effects of the sun's rays. Both Molesworth and Paul speak of this condition, but do not say that they have ever seen a case of it in Australia.

When making an analysis of one thousand cases of skin patients treated privately by the late Professor McCaul Anderson in Glasgow in 1888, I had an opportunity of seeing a patient with *xeroderma pigmentosum* under his care at the Royal Infirmary, Glasgow.

I obtained permission to take the patient, a boy of nine years, to Edinburgh where at the Royal Infirmary Dr. Jamieson gave a clinical lecture on *xeroderma pigmentosum*.

This was the first case reported in Scotland. It was the first case Professor McCaul Anderson had seen in an experience of 45,000 cases.

Since that time I have in my clinics seen an equal number of patients without seeing one case of *xeroderma pigmentosum*, although I have seen several cases of this disease in foreign clinics. Considering the condition of our climate in Australia, it is curious no case of *xeroderma pigmentosum* has been reported up to the present.

Radium Treatment.

The late Dr. Harold, of Adelaide, who was President of the Section for Skin Diseases at the last medical congress held in Melbourne, spoke of the large number of cases of the epithelial triad which came under his care for treatment both in hospital and in private practice. He spoke enthusiastically of radium in the treatment of these conditions.

However, as regards the treatment of skin cancer, I regard it as beyond the scope of this paper.

Of course we cannot change the climate of this country, but some means of preventing or lessening this evil should receive consideration. Broad brimmed hats for men and dark veils for women would of course help to lessen the effects of the actinic rays of the sun. For tennis players and golfers I have prescribed Darier's ointment and powder, which contain a quinine salt, and patients have spoken well of this treatment. Keratolytics, as salicylic acid *et cetera*, are useful for early keratoses.

A hygroscopic ointment containing *adeps lanæ* is cheap, but all these applications are hardly suitable for a man working out of doors. The Red Indian appears to be free from these dermatites due to the irritation of the sun's rays and suggests a stain or dye of reddish brown colour for the back of the hands, arms and neck which might be of value if the individual would submit to it during working hours.

A case of *xeroderma pigmentosum* treated by ultra-violet rays is reported by Dr. L. W. Lord in the *Archives of Dermatology and Syphilology*, page 639, November, 1927. *Similia similibus curantur.*

The patient, a boy of four years of age with well marked *xeroderma pigmentosum*, was treated by ultra-violet rays, the first dose being two seconds back and front at thirty inches distance from the burner of the quartz lamp. The treatment was given twice a week and the dose was gradually worked up to sixty seconds. There was definite improvement, keratoses lessening in size and number; all ulcers healed and lachrimation was greatly

decreased, so that the patient's eyes could stand a certain degree of light.

This case suggests on the principle of *similia similibus curantur* that the red-haired, blue-eyed, fair-skinned Irishman might be rendered immune to our climate by preparatory treatment with ultra-violet rays.

However, radium seems to be our great standby at the present time.

In using radium one should remember that Nature tried to ward off rodent ulcer growths by the formation of a fibrous barrier against the inward growth of the pathological tissues. Radium applications should therefore aim at the disintegration of diseased tissues and at the same time influencing the formation of the fibrous barrier in the healthy tissues beyond.

In advanced cases of *dermatitis solaris chronica* with keratoses and epitheliomata, I look upon the condition as one of *noli me tangere* as far as surgery is concerned, but if the epithelioma is non-radio-sensitive excision and skin grafting should be adopted or diathermy applied. Of course the earlier patients with the epithelial triad come under treatment, the better is the chance of curing them.

Successful radium therapy depends upon the practical knowledge of the radio-sensitivity of pathological tissues. And a knowledge of the radio-sensitivity of growths is a matter of *experientia docet,* an experience difficult to put into words.

Dr. Pinch states that at the Radium Institute, London, he has administered over 100,000 treatments with radium, but unfortunately he does not give a special chapter in his book to this subject of radio-sensitivity. Of course in dealing with different diseases he mentions how some are much more favourably affected by radiations than others "as for instance sarcoma of the tonsil is usually so markedly radio-sensitive that favourable results can be promised before any treatment by radium is tried." Yet many cases of sarcomata and other growths which may be quite similar pathologically and clinically, are entirely different as regards their radio-sensitivity.

Like Dr. Pinch, I have during the past twenty-four years administered over 100,000 treatments in my public and private clinics, but I must admit I have by no means mastered this subject of the radio-sensitivity of pathological conditions. As regards the normal tissues the radio-sensitivity of them seems to be much more constant. For instance, the hair papillæ and gonad tissues are definitely radio-sensitive, although the different depths at which the hair papillæ occur, make it necessary to apply different dosage for the destruction of them.

The literature upon radium therapy is now very extensive and it is extraordinary how writers differ as regards what cases are suitable for radium treatment.

However, the introduction of radium needles, the burying of radium tubes *et cetera* will probably help in determining this matter.

Propaganda.

Of course, the earlier epithelial triad patients come under treatment, the better is the chance of curing them. Some months ago Sir George Syme spoke upon the wireless in regard to the cancer trouble and suggested that people should seek treatment without delay when the first evidence of anything which might be suggestive of cancer appeared. And, *inter alia,* he drew attention to the importance of small warty-looking formations upon the skin and advised people with such conditions to consult a medical man about them, as they were sometimes the beginning of malignant growths. After this advice by the wireless, it was noticeable that quite a number of persons sought advice for early rodent ulcers, keratoses *et cetera.* Many of these patients' troubles were in an early, curable stage, whereas it so often happens that these conditions are neglected until they have ulcerated or at any rate developed into a condition not nearly so favourable for treatment as when they first appear. One frequently converses with persons who have these early evidences of skin cancer, but of course medical ethics stands in the way of mentioning the matter. However, like Sir George Syme, our health officers are not practising surgeons and they should be able to draw the attention of the public to the importance of having these small formations upon the skin attended to.

Reviews.

TELLING THE WORLD.

SIR WILLIAM ARBUTHNOT LANE has been well known to the medical profession for many years on account of his heterodox views. More recently he has contributed a series of articles to the *Daily Mail,* in direct contravention of the ethical rules of the medical profession, which rules have been formulated for the protection of the suffering public. These articles have been published in book form and the publishers have been unwise enough to submit the result to the medical press for review.[1] The author is described as the founder of the New Health Society. The contents of the book is undiluted clap trap. It is of the dangerous kind, because there is a manifest tendency in each chapter to base unsupported statements on half truths. The author apparently has not studied physiology at all events in its modern form. He dares to suggest that a single daily motion leads to over-distension of the large intestine; that this leads to mechanical changes, including the formation of bands and kinks; that the result of these changes is the engorgement of the "mucus" and its ultimate ulceration (may be the learned surgeon means the mucous membrane); and that the ultimate effect of the dilatation and ulceration is the formation of the nidus for the growth of cancer organisms.

The worst advice given in the book is on page 97. He tells boys and girls that they should not adopt a passive attitude toward those who educate them, that they should not obey the instructions received and that they should realize that very much of what is generally accepted as true, is false.

The author has received assistance from others seeking the lime light. This kind of writing may attract people who are incapable of judging for themselves. We cannot conceive that it will attract the intelligent reader either as a literary production or as an advertisement of the erudition of the author and his friends. It is a book to avoid.

[1] "Secrets of Good Health," by Sir W. Arbuthnot Lane, Bart., C.B., 1927. London: William Heinemann (Medical Books) Limited. Crown 8vo., pp. 152. Price: 3s. 6d. net.

The Medical Journal of Australia

SATURDAY, SEPTEMBER 29, 1928.

The Victorian Health Bill.

AN announcement was made last week of the second reading of the *Ministry of Health Bill* by the Legislative Council of Victoria. It will be within the remembrance of readers that in 1919 the law concerning the control of the public health was amended by the creation of a Commission of Public Health with the Chief Health Officer as Chairman and six other members of whom two were medical practitioners. The 1919 measure was complicated, but gave wider powers to the Commission than those possessed by the Board of Health under the Act of 1915. In commenting on this measure in 1919, we pointed out that it was far from ideal, although it was greatly superior to the previous legislation. It appears that in the seven and a half years since the *Health Act*, 1919, has been in operation, every one concerned with its administration has recognized that there is need for amendment in several important directions. The Honourable S. S. Argyle, when Minister of Public Health in the Prendergast Ministry, initiated a measure according to which all the health and medical activities of the State were to have been placed under the control of a Minister of Public Health who would hold no other portfolio. There was to have been the coordination of the Health Department, the Lunacy Department, the School Medical Department and the Factory Department. The bill had not secured a place on the statute book when the ministry went out of office. The present Minister of Public Health, the Honourable W. J. Beckett, has accepted the main ideas that actuated his predecessor and has had the *Ministry of Health Bill* drafted. It is not proposed to appoint an additional minister for this measure. The present bill provides for the creation of a general health branch, a mental hygiene branch and a sanitary engineering branch. The Minister of Public Health at the time when the bill becomes law is to be the Minister of Health. Under him there are to be a Secretary of the Department, a Chief Health Officer, an Inspector-General of Mental Hygiene and a Chief Sanitary Engineer and such other officers and employees as are deemed necessary. It is specifically provided that the persons holding office under the *Health Acts* as Chief Health Officer and Sanitary Engineer when the bill is passed, shall become Chief Health Officer and Chief Sanitary Engineer under the new act and that as soon as the transfer of the administration of the *Lunacy Acts* to the Minister of Health has been effected, the Inspector-General of the Insane shall become Inspector-General of Mental Hygiene. It thus appears that the heads of the three branches shall continue to act under the new circumstances. The change is not to leave any of these three officers less well off in regard to "his accrued or accruing rights relating to tenure of office, salary, pension or superannuation than he would have been if this Act had not been passed." The Governor in Council may transfer to the Minister of Health any other powers and duties of any Government department which appear to relate to matters affecting the health of the people or to relate to other matters which it is held to be expedient to transfer. Conversely the Governor in Council may transfer powers or duties from the Department of Health to other Government departments. In his statement to the Council the Minister pointed out that, while he had wished to place the administration of the *Hospitals and Charities Act* in the hands of the Minister of Health, objection had been raised to this proposal by the Treasury and the Government had concluded that it would not be wise at this stage to introduce such a provision. The remaining clauses of the bill are drafted in such a manner that the Minister and the heads of the several branches could exercise powers in various directions not specifically mentioned in the measure. In his speech the Minister mentioned the several medical activities of the Government. The Chief Secretary's Department has control of the medical aspects of lunacy, jails, police, child welfare, workers' compensation, medical registration, pharmacy and inebriety. He stated that the Health

Department seemed to be the proper controlling body. The following acts are to be administered by the Minister of Health: The *Medical Acts*, the *Poisons Acts*, the *Inebriates Acts*, the *Lunacy Acts*, the *Children's Welfare Acts*, the *Infant Life Protection Act*, 1915, the *Children's Maintenance Acts*, the *Crimes Acts*, the *Gaols Acts*, the *Police Regulation Acts*, the *Workers' Compensation Acts*, the acts relating to the Government medical officers, the *Education Acts* and the *Factories Act*, in so far as these measures deal with medical matters.

The general provisions of the bill and the consequential amendments of the existing statutes will receive the approval of the medical profession, for the object is the coordination of medical activities in connexion with the control and prevention of disease. The two flaws in the measure are that the Minister is not to devote the whole of his time to this very wide and comprehensive undertaking and secondly that the permanent head of the department may be a non-medical officer. He is to have the full responsibilities of administering all the acts subjected to the Department. He must be an officer in the first division of the public service. The present Chief Health Officer will lose his position as Chairman of the Commission on the abolition of that body and will be subordinated to a layman whose powers of intelligent administration of medical measures must necessarily be limited by the fact that without medical training and experience he cannot form a reliable opinion on purely technical matters. Moreover, it would be very bad policy to require a medical practitioner who has had the full responsibility for the administration of the *Health Act*, to accept a secondary position to a layman. The same criticism obtains in regard to the Inspector-General of Mental Hygiene. It would, of course, be impossible to have two permanent heads of the Department. But there would be no essential difficulty if the chief medical officer of the branch dealing with mental hygiene were responsible to a medical practitioner, expert in all branches of preventive medicine and hygiene. It is significant that the debate on the second reading was postponed until the Minister heard the opinions of the members of the Victorian Branch of the British Medical Association. The Honourable H. I. Cohen, K.C., takes the same view as the medical profession in this respect. It now remains to be seen whether the Government will listen to reason and amend the bill or insist on a provision that will without doubt render the measure unworkable and alienate the sympathies of the medical profession.

Current Comment.

PERNICIOUS ANÆMIA.

THE view that Addisonian or pernicious anæmia is of bacterial origin is held by the majority of investigators. The work that has recently been done in connexion with liver feeding in the disease, is not antagonistic to this view. On the contrary, as was pointed out in our issue of June 30, 1928, the action of bacterial toxins on the liver may be responsible for interference with the metabolism of certain liver cells to such an extent that there is no formation of the active principle the existence of which has naturally been assumed by every investigator. The work of Hurst on a streptococcus as the causative organism is well known and has been discussed in these pages. *Bacillus coli communis* and *Bacillus welchii* have been held by others to play some part in the ætiology. L. S. P. Davidson holds the view that chronic medical conditions which are vaguely assigned to auto-intoxication, may be due to an increase of numbers and toxicity of organisms normally present in the intestine. Acting on the idea that the ætiology of pernicious anæmia is intimately connected with the absorption of a bacterial toxin, he has made both qualitative and quantitative bacteriological examinations of the gastro-intestinal contents of forty-one persons suffering from pernicious anæmia.[1] The material examined consisted of fæces and stomach and duodenal contents removed by an Einhorn tube. When duodenal contents were required, skiagrams were taken so that it would be certain that the tube had entered the duodenum. The controls consisted of healthy persons, such as football players and students in athletic training and persons suffering from various pathological conditions, such as cancer of the stomach, secondary anæmia and colitis. A series of dilutions of the various fæcal specimens was made and 0·01 cubic centimetre of each was plated. The author practically confined his attention to *Bacillus coli communis*, streptococci and *Bacillus welchii*. In general it was found that the fæces in pernicious anæmia contained more *Bacilli coli*, more streptococci and especially more *Bacilli welchii* than are present in normal people or in persons suffering from various other diseases. There is one consideration which may affect the results to some extent. The so-called normal people were footballers or students in training. Undoubtedly they would be persons whose bowels acted regularly

[1] *The Journal of Pathology and Bacteriology*, July, 1928.

and in whom intestinal stasis would be unlikely to occur. The same could not in all probability be said of those with pernicious anæmia or those suffering from other pathological conditions. This aspect is not considered by the author. At the same time his figures are remarkable. The third dilution was the upper limit at which bacterial growth (*Bacillus coli* or streptococcus) was found in specimens from normal persons. In only 5% were viable organisms obtained from higher dilutions. On the other hand the figures from other pathological conditions and from pernicious anæmia are 70% and 80% respectively. In regard to *Bacillus welchii* the average dilution at which it was isolated, was one hundred times greater than that found in normal persons.

A qualitative examination was made of coliform bacilli, streptococci, *Bacillus acidophilus* and *Bacillus welchii*. Standard reactions were determined in each instance and any departure from these was regarded as an abnormality. It was concluded that atypical forms of *Bacillus coli* are absent or very rare in normal persons. A few are found in various pathological conditions and in pernicious anæmia, but there is no reason to suppose that this disease is associated with any particular variety. No evidence was obtained that any special type of streptococcus or *Bacillus acidophilus* is related to pernicious anæmia. No special strain of *Bacillus welchii* which could be distinguished by hæmolytic or fermentation reactions, was found to be associated with pernicious anæmia.

The stomach contents of twenty and the duodenal contents of ten patients with pernicious anæmia were submitted to bacteriological examination. No details are given of any control experiments. It is merely stated that from an examination of stomach and duodenal contents of normal persons, rats and dogs it was concluded that microorganisms are actually or practically absent from normal stomach contents. It was found that every patient with pernicious anæmia had a high bacterial content of the gastro-duodenal fluids, but that "no specific organisms were demonstrable." The numbers of viable organisms present varied from one hundred thousand to one hundred million per cubic centimetre of material examined. Hæmolytic forms of *Bacillus coli* or of streptococci were so rarely present as to be of no ætiological importance. *Bacillus welchii* was found, but only in relatively small numbers. Davidson expresses himself as satisfied that the latter organism can be of little significance in relation to the gastro-duodenal sepsis of pernicious anæmia.

In discussing his work, Davidson states that his investigation confirms the results obtained by Moench Kahn and Torrey, that large numbers of *Bacillus coli*, streptococci and *Bacillus welchii* are obtained from the fæces of patients with pernicious anæmia. In order to establish a claim that an organism is the causal agent in a disease, it is necessary to show first of all that it is present in every instance and that it has some specific property or in the second place that it is present in every instance in abnormal numbers for abnormal situations. He maintains that no organism found in the intestinal tract of patients with pernicious anæmia fulfils these conditions. As already stated, Davidson holds that *Bacillus welchii* is of little significance in relation to the gastro-duodenal sepsis of pernicious anæmia; he agrees with Nye that the principal factor producing the high *Bacillus welchii* count is the altered biochemical reaction to the contents of the small intestine. The combination of optimal growth, toxin production and absorption which take place in the small intestine, is in his opinion a fact of great importance in the ætiology of pernicious anæmia. Davidson states that although on biological and experimental grounds *Bacillus welchii* appears to have the best claim to be regarded as an ætiological agent, its claim on bacteriological grounds to be the causal agent cannot be substantiated, since in a small percentage of patients with pernicious anæmia it occurs in normal numbers.

Several facts must be borne in mind. In the first place streptococci have been found in the blood of patients during the febrile stage of pernicious anæmia. In the second place a regular response as evidence by the blood count has attended the use of autogenous streptococcal vaccines. In the third place there is a definite relation of evidence of destruction of red cell formation and of a leucocytic reactive response,

In the absence of hydrochloric acid the bacteria are not killed and so may be absorbed through the wall of the duodenum. The point to be considered is whether the increased flora is part of the condition known as Addisonian anæmia or whether it is present in the predisposing achlorhydria. In other words it is likely that, had Davidson investigated a series of persons suffering from achlorhydria, that is candidates for pernicious anæmia, he would have found the same bacterial flora as he found in persons affected by the mature disease.

CEREBRAL GLIOMATA.

On another page in this issue there appears an abstract of an article by E. A. Carmichael on cerebral gliomata. The classification of tumours of this type has been difficult and considerable variation in the terminology has been evident. Bailey and Cushing divided these tumours into fourteen groups according to their relationship to the neurological *"Anlage."* There can be no doubt that Carmichael's simpler classification into two main groups, spongioblastic and astroblastic tumours, will be useful. The former occur commonly in people over forty years of age and cause focal signs before general pressure symptoms. The latter occur in people under forty-one years of age and as a rule cause pressure symptoms before local signs. The former recur readily after enucleation and are not amenable to radiation, the latter offer more hope with both types of treatment. Carmichael's work is important not merely to the pathologist, but to the practising surgeon.

Abstracts from Current Medical Literature.

MORBID ANATOMY.

Cerebral Gliomata.

E. ARNOLD CARMICHAEL (*The Journal of Pathology and Bacteriology*, July, 1928) discusses the subject of cerebral gliomata. His communication is based on the study of seventy-five cerebral tumours, sixty-two of which were classified as gliomata. The author holds that a knowledge of the histiogenesis of the brain is essential to the understanding of the classification of gliomata. Arising from the epiblastic tissue of the embryo, the medullary plate eventually becomes the neural tube. At this stage two main types of cell are found, the primitive spongioblast and the germ cell. Some of the primitive spongioblasts collect towards the centre of the tube and eventually become the ependymal spongioblasts from which the adult ventricular ependyma is derived. The remaining spongioblasts, after passing through the various stages of the apolar, unipolar and bipolar spongioblasts, eventually become astroblasts. Astroblasts are recognized by their affinity for gold and by the presence of a process known as the "sucker foot," which appears to be attached to the wall of a capillary vessel. Astroblasts are still embryonic; they develope further to give rise to one of two types of cell. Some lay down fibrils within the cell and become fibrillary astrocytes; others send out processes throughout the surrounding tissue and constitute the protoplasmic astrocytes. The germ cell gives rise to two types of cell, the apolar neuroblast and the medulloblast. The former pass through a bipolar and a unipolar stage and eventually become adult nerve cells or neurones; their protoplasm has an affinity for silver. Medulloblasts retain the staining character of the germ cell and exhibit no affinity for either silver or gold. It has been suggested that they give rise to the adult type of cell known as oligodendroglia. The pineal parenchyma and pineal glia arise from a collection of cells at the junction of the forebrain and the mid-brain. Cells derived directly from the medullary epithelium form the chorioid epithelium. Each of these cell types gives rise to its own variety of tumour. The spongioblasts give rise to the *spongioblastoma unipolare* and the *spongioblastoma multiforme*. The cells of the former have only a single process and those of the latter only faintly resemble the spongioblasts; they occasionally have multiple nuclei and seldom have processes. The astroblasts give rise to astro-blastomata and the fibrillary astrocytes to *astrocytoma fibrillare*. Protoplasmic astrocytes give rise to a tumour known as *astrocytoma protoplasmaticum* and the medulloblasts to medullo-blastomata. The oligodendroglia cells go to form the oligodendro-gliomata. The cells of the microglia are mesoblastic in origin and thus do not form the main type of cell in any glioma. In the author's series there were thirty tumours described as *spongioblastoma multiforme*. This is a very cellular type of tumour and is the glio-sarcoma of early writers. Three tumours were described as *spongioblastoma unipolare*. Ten tumours were regarded as astro-blastomata. These are easily recognized on histological examination. The cell processes were found extending in all directions, and it was usually possible to discover a process attached to a blood vessel by means of a "sucker foot." Six tumours were classified under the heading of *astrocytoma fibrillare*. These were characterized by diffuse infiltration. To the naked eye the tumour was not recognizable, but appeared only as a general increase of the white matter. It was difficult to distinguish the tumour from a mere œdema. Examination under the high power showed that the increase of cells involved the fibrillary astrocytes alone. The clinical facts as suggested by the duration of the illness and age were in accordance with the pathological findings. The more malignant and more embryonic type of tumour was the more rapidly growing and more commonly affected people over the age of forty. The author holds that he has found it possible by careful examination to place any tumour into one of the many groups suggested by Bailey and Cushing. It appears obvious to him, however, that there are two main groups: (i) *spongioblastoma multiforme* and *spongioblastoma unipolare*, (ii) *astrocytoma fibrillare* and astro-blastoma. These two groups may be conveniently called spongioblastic and astroblastic. He points out that although the whole of the tumour was not composed in every instance of cells of one type, it was seldom that one part of a tumour was typical of an *astrocytoma fibrillare* and another part of a *spongioblastoma multiforme*. He believes that the simple classification will be as valuable to the surgeon and the neurologist as the more elaborate one of Bailey and Cushing. These two groups, moreover, are characterized by definite pathological and clinical differences.

Osteo-blastomata not Connected with Bone.

C. P. RHOADS AND HERMAN BLUMGART (*The American Journal of Pathology*, July, 1928) report the discovery of two tumours with the histological characteristics of osteogenic sarcoma, not connected with bone and clinically benign. One tumour occurred in the thigh of a woman, twenty-one years of age, who gave a history of trauma from a collection of coins which repeatedly struck the limb as she carried them in a pocket. The tumour occurred in the substance of the *adductor magnus* muscle and was easily shelled out at operation. The background of of the tumour consisted of narrow, elongated, spindle-shaped cells, mostly of an adult type with an oval nucleus and a small amount of acidophilic cytoplasm. The intercellular substance was composed of delicate collagen fibres grouped in parallel rows to form wavy strands. In certain areas every stage in the transition from connective to osteoid tissue and from osteoid tissue to bone was seen. Strands of connective tissue anastomosed and the fibroblasts in these regions were enlarged and variable in appearance. They lost their fibrils and became oval and fusiform in shape. As the intercellular substance increased in amount, single and paired cells were isolated and appeared in small lacunæ. As the bone more nearly approached the adult type, the cells decreased in size and appeared like typical bone cells. Around the bone spicules rows of osteoblasts were arranged, laying down more hyaline substance. The second tumour occurred in a man, thirty-seven years of age, was situated in the groin and was diagnosed as a fibroma of the fascia. There was a history of trauma. Two types of bone formation were observed in this tumour. The osteoid type seen in the first tumour was present, but did not form the predominating picture. Atypical fibroblasts were laying down dense homogeneous intercellular substance which finally became true bone. The authors discuss the characteristics of osteogenic sarcoma and hold that every one of the criteria for the identification of this type of tumour has been fulfilled by these tumours. All the variations in morphology characterizing tumour cells were present. Multiple mitoses and giant cells could be seen and all varieties of new bone formation were going on. They conclude that neoplastic bone formation may take place without connexion with primitive or adult bone-forming cells. Under certain conditions fibroblasts can take on the function of tumour as well as metaplastic bone formation.

Acute Yellow Atrophy of the Liver.

BENJAMIN ROMAN AND DE WITT SHERMAN (*Bulletin of the Buffalo General Hospital*, July, 1928) record the anatomical findings in the liver in the body of a child, aged eight and a half months, who died of "idiopathic" yellow atrophy of unusually short duration. The clinical history is admitted as being imperfect, but it is stated that the disease did not last longer than eight days and was probably of much shorter duration. The weight of the liver was not strikingly reduced, it weighed "close on" 200 grammes. The autolytic process involved the whole organ and fatty degeneration was present to an extent which is unusual for this disease. The quantity of fat seemed to point to phosphorus as a possible ætiological factor, but the distribution of the fat and the cellular changes were quite different from those of phosphorus poisoning. Hand in hand with the accumulation of relatively small particles of fat in the cytoplasm there was a rapid destruction of the cell—a picture quite typical of the so-called

idiopathic form of the disease. Although the process was early, attempts at cell division which was chiefly amitotic, were evident in the hepatic cells and moderate sprouting of bile ducts was present. Nowhere were groups of newly formed cells to be found. Apparently the autolytic process was so intense that the new cells were destroyed as rapidly as they were produced. The beginning of the process could be seen in the periphery of the lobules and there was considerable inflammatory infiltration of the portal spaces. An extreme degree of fatty change was present in the kidneys.

MORPHOLOGY.

Epicritic and Dyscritic Systems in a Primitive Primate.

H. H. WOOLLARD (*Journal of Anatomy*, April, 1928) states that the brain of *Tarsius* exhibits, as do so many other features of its anatomy, a combination of characters which at once make it very primitive and very advanced. Whatever factors have brought about evolution, it is difficult to escape the conclusion that all the existing primates have started from a tarsioid stock, of which the existing tarsier is the representative. The efferent side of its neural organization is the least developed. For example there are the slight characterization of the motor area and the slender pyramidal columns and the primitive states of the basal ganglia, the red nucleus, the *pons* and the cerebro-pontine systems. On the other hand, the sensory side shows distinct signs of progress. This is evident in the fifth nerve, in the optic mechanisms and in the organization of the *thalamus* and the superior development generally of the sensory side of the nervous system. Hence it would be anticipated that, given the zoological position of *Tarsius*, indications should appear in sensory mechanisms of the emergence of a higher level of epicritic appreciation. To show that vision should be the predominant epicritic mechanism in primate evolution has been the work of Elliot Smith, but in this contribution an attempt has been made to consider the brain stem of *Tarsius* in terms of a generalized conception of epicritic and dyscritic neural mechanisms.

The Hyaloid Canal in the Fœtus and in the Adult.

I. C. MANN (*Journal of Anatomy*, April, 1928) has made an attempt to demonstrate by correlation of biomicroscopical and embryological findings what may be considered the normal relations of the canal from fœtal to adult life. That the presence of Cloquet's hyaloid canal may be considered as an anatomical structure throughout life is vindicated by the most certain of methods, namely, *intra vitam* microscopy. The usual median horizontal position assigned to it in text books is inaccurate if the body be supposed to be in the anatomical attitude. Further, its situation may vary on movement or under the influence of gravity and also minimal persistence of the lental end of the hyaloid artery is normal in man.

The Distribution of the Nerve Cells in the Ventral Columns of the Spinal Cord.

C. HELEN CRAW (*Journal of Comparative Neurology*, April 15, 1928) gives an account of an investigation into the arrangement of the ventral horn cells which was undertaken primarily to establish the presence or absence of evidence of a segmental distribution of these cells. The external appearance of segmentation due to the orderly arrangement of the nerve roots may be forced upon the cord by the segmental development of tissues surrounding it and may not necessarily be accompanied by a real cytological metamerism of the nervous tissue itself. This investigation has shown, however, that the motor cells of the thoracic region of the human spinal cord are not arranged in a uniform column, but exhibit major and minor variations. There is no segmental rise in the number of cells, as suggested by the common description of the arrangement. The results of four accurate longitudinal counts indicate at least a major diminution of cells in each segment. It is suggested that this variation is not embryonic in origin, but is a topographic arrangement explainable on physiological (neurobiotactic) grounds. A thoracic segment of the human spinal cord contains about 1,500 motor cells in each ventral column. This number is present in the cord at birth and has not increased at three years. The cells themselves increase in size, particularly in the diameter parallel to the long axis of the cord.

The Association Callosal and Projective Fibres of the Cerebral Cortex of the Cat.

S. POLJAK (*Journal of Comparative Neurology*, December 15, 1927) gives an account of an investigation on the fibre connexions mainly of the occipito-parietal region of the cat's hemisphere. He concludes that there does not exist a "diffuse" distribution of afferent fibres in wide regions of the hemispheric cortex, as was claimed by certain prominent investigators, but on the contrary there is a definite projection of the retina upon the cortex. The investigations also corroborate the essential part of Flechsig's conception of the division of the hemispheric surface into projection "centres" apart from centres of association, although in somewhat different form, for both centres give origin to corticofugal fibres, destined for the subcortical nuclei and for the opposite hemisphere. This means only that the connexions and consequently the functions of cyto-architectural areas are not homogeneous and uniform, but manifold. Considering the narrow "entrances" for peripheral impulses and the existence of regions of correlation in the hemisphere, the author states that it is difficult to bring this fact into accord with the conception of functional "equipotentiality" of the entire hemispheric cortex as is accepted by Floureus, Goltz and others, but is, on the contrary, the principle of structural differentiation and functional diversification within the hemisphere or the so-called "principle of localization" which seems to be supported by the present findings. Among the more particular conclusions arrived at during the course of the investigation was that with regard to the course and mutual arrangement of fibres within the centre of the path. It was found that the principle of localization does exist in the entire of the path as an architectural principle not only in regard to the latter's "gross" relation to the hemisphere, but also in regard to its internal organization.

The Subthalamic Nucleus.

L. O. MORGAN (*Journal of Comparative Neurology*, December 15, 1927) points out that as the *corpus striatum*, with the exception of a descending tract to the motor nuclei of the cranial nerves, discharges into nuclei of the subthalamic and hypothalamic regions, it follows that an understanding of the function of the *corpus striatum* is dependent to a large degree upon the knowledge of these nuclei into which it discharges. Moreover, clinical and experimental evidence tends to show that centres for some very important and fundamental functions are located in the subthalamus and hypothalamus of the brain. The author has therefore undertaken an investigation into the function and fibre connexions of the nuclei of these regions in the dog and in this communication reports his findings with regard to the subthalamic nucleus of Luys. This nucleus gives rise to a large descending system which leaves the nucleus on its medial side and continues caudal over the dorsal and medial surface of the *substantia nigra* to terminate as follows. The majority of fibres ends on a group of large motor cells, compactly arranged in the form of an inverted comma. The rounded head of the nucleus lies medial to the *substantia nigra*, while the tail extends laterally over the dorsal surface. Some end on cells of the same type as described above, which are scattered throughout the region dorsal to the mamillary peduncle and the ventral and medial capsule of the red nucleus. A few fibres cross caudal to the mamillary bodies and terminate on the opposite side in the same manner as the homolateral fasciculus. The cells upon which the subthalamic fibres terminate (sometimes considered a part of the *substantia nigra*) are physiologically and histologically quite distinct from the cells of the *substantia nigra* proper. The most pronounced symptom following a lesion in the subthalamic nucleus of Luys was a hypertonic condition of the voluntary muscles. Corresponding in degree to the hypertonicity, movements were slow, deliberate, halting and inaccurate, lacking the smooth rhythm of a normal movement.

British Medical Association News.

SCIENTIFIC.

A MEETING OF THE NEW SOUTH WALES BRANCH OF THE BRITISH MEDICAL ASSOCIATION in conjunction with the Section of Medical Literature and History was held on July 26, 1928, at the B.M.A. Building, 30-34, Elizabeth Street, Sydney, DR. J. E. V. BARLING, the President, in the chair.

Harvey Tercentenary Celebration.

DR. J. E. V. BARLING said that the object of the meeting was to celebrate the three hundredth anniversary of the publication of Harvey's immortal masterpiece entitled: "De Mortu Cordis et Sanguinis." In *The British Medical Journal* there was an account of meetings which had been held in London two months previously with a similar object. The meeting they were holding that evening of necessity lacked the local colour, completeness of detail and pomp and circumstance of the meetings in London, but in its essentials there was no need for it to be lacking. He was sure that that meeting would show as keen an appreciation of Harvey's work and all that it had meant to medicine as any other and he was also convinced that the members entertained an equal admiration and respect for Harvey as a man. Harvey, like all other great pioneers, owed something to his contemporaries and predecessors. It was difficult to gauge how great that debt was after the lapse of so much time.

In seeking for a possible source for Harvey's inspiration he had been struck by the similarity that had existed between Harvey's attitude to scientilc problems and that adopted by Leonardo da Vinci. da Vinci had died between fifty and sixty years before Harvey was born. He was as great an anatomist as he was a painter and he had seen the tragic influence of tradition on the work of others. He had recognized that the only way of escape lay in accurate observation. His attitude might be expressed in the following terms: "Imitate no one; acquire knowledge by observation and thus seek to elucidate the phenomenon of Nature." This attitude corresponded exactly with that of Harvey. Harvey, sensible of the sway that superstition had exercised over medical science for centuries, had resolved to imitate no one and to make accurate observation the basis of his conclusions. How well he had succeeded was shown by the excellence of his work. Unfortunately for the world and for da Vinci he was so far ahead of his time that his was as the voice of one crying in the wilderness. Happily for medicine and for Harvey the trust which he placed in the love of truth and in the candour which that inhered in cultivated minds, was well founded. His attitude was appreciated as the correct one, especially by the younger members of the profession who gradually accepted the truth of his conclusions. Harvey lived to see his views indicated and their truth admitted throughout the scientific world. There was thus some connexion between da Vinci's work and Harvey's; the one supplied the necessary inspiration and stimulus for the other.

Before calling on the three speakers he wished to add a word or two in appreciation of the work that was being done in the Section of Medical Literature and History. The history of medicine was an aspect of the subject which was often neglected more from want of time than from want of inclination. The members of the Section by bringing the interesting facts of medical history before the Branch were doing spade work and presenting their contemporaries with the fruits of their toil. They gave their listeners a great deal of pleasurable information and added to medical culture. He thought that they were deserving of the thanks of the Branch.

DR. HARVEY SUTTON read a paper entitled: "William Harvey: The Man and His Times" (see page 392).

DR. F. GUY GRIFFITHS read a paper entitled: "William Harvey, M.D., F.R.C.P.: Some Aspects of His Genius" (see page 396).

DR. L. COWLISHAW read a paper entitled: "Harvey's England: 1578-1657: Glimpses of the Times both Lay and Medical" (see page 398).

All three papers were illustrated by exhibits of lantern slides.

DR. W. J. STEWART MCKAY spoke in appreciative terms of the papers that had been read and congratulated the Branch on having organized a meeting which had proved so interesting and valuable to the members attending.

A MEETING OF THE VICTORIAN BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the Medical Society's Hall, East Melbourne, on June 6, 1928, DR. J. NEWMAN MORRIS, the President, in the chair.

Skin Cancer in Australia.

DR. HERMAN LAWRENCE read a paper entitled: "The Relative Low Humidity of the Atmosphere and Much Sunshine as Causal Factor for the Great Prevalence of Skin Cancer in Australia" (see page 403).

DR. E. H. MOLESWORTH opened the discussion. He expressed thanks and appreciation of the honour done him by the request to come to Melbourne. He was always pleased to come to Melbourne and he was inclined to think that it was becoming a habit.

Dr. Lawrence's contribution to the subject of climatic influence in the production of rodent ulcer had been known to him (Dr. Molesworth) in a vague way, but it was a far cry from climatic influences in general to ultra-violet rays in particular as a causative influence. The Brisbane Congress discussion mentioned in Dr. Lawrence's recent contribution in THE MEDICAL JOURNAL OF AUSTRALIA was the result of a paper by himself (Dr. Molesworth) on the subject. Moreover, it was Dr. Lawrence's opposition to the speaker's contention that keratoses and rodent ulcers were due to light effect only that had stimulated him (Dr. Molesworth) to collect further evidence on the subject. Dr. Molesworth said that he did not care personally to whom came first the idea that this disease, epitheliomatosis, was due to exposure or to sunburn or even to the effect of ultra-violet light and, if his paper had seemed to be unjust to Dr. Lawrence, he apologized. He was concerned with the value of the work done and of the evidence collected and had presented his own paper.

There was a considerable amount of labour involved in collecting pathological and ætiological evidence of the sort and quantity given in the paper, the time for which had to be snatched from leisure hours and yet, if the result were useful and the hypothesis placed upon a foundation of evidence instead of a mere vague personal impression, he was content. Now the hypothesis was based on a sound foundation of observed facts, it had gained favour in parts of the world other than Australia. *The Cancer Review* and the *Bulletin of Hygiene* had given long and favourable reviews of the hypothesis and had commended it to all workers in the cancer problem.

During his recent visit to Europe he had wrung from Dr. Adamson (who had hitherto opposed the view that rodent was caused by sunburn, though he admitted this as a cause of squamous epithelioma) the admission that rodent ulcer might also be the result of light irritation. Dr. Molesworth admitted that there were certain serious gaps in the case as presented by himself. The chief of these was the absence of evidence, at the time of publication of his paper, that ultra-violet light treatment had ever produced even a preliminary stage of epitheliomatosis. This evidence, however, was speedily forthcoming, he was glad to say, from an Australian, Dr. Colquhoun, who had published in *The British Journal of Dermatology and Syphilis* an account of a man treated for a long period with ultra-violet light, who developed unmistakable keratoses of the preepitheliomatous type. This evidence was most valuable and welcome, as its absence was at once noticed and had been commented upon in early criticisms of his (Dr. Molesworth's) original paper. Other evidence was now also available which had a direct or indirect bearing upon the hypothesis. When he was in London he had seen a man exhibited before the British Association of Dermatology who had been used for years for the purpose of demonstrating to students the radioscopic appearances of a normal thorax. He had developed

a very mild degree of chronic X ray dermatitis on his back and on several of these points had appeared infiltrations which on histological examination had been shown to be basal celled epithelioma, rodent ulcer and not squamous celled epithelioma which had been supposed to be the only type of neoplasm induced by X rays.

This supported the contention which ascribed the development of basal celled or squamous celled epithelioma respectively to a moderate degree of irritation by ionization.

A further piece of evidence, obtained almost by accident, was that in India, at the school of Tropical Medicine, controlled by Dr. Muir, rodent and squamous epithelioma of the skin were unknown in the coloured natives, except on the site of old burns (kangri cancer) and that the only examples observed were in Europeans.

This evidence was supplied by Dr. Torrey, of San Francisco, who had recently spent six months with Muir and who had also informed him on a recent visit to Sydney that rodent and skin epithelioma were much more frequent in California than in the eastern States of America.

So it would be seen that evidence was being accumulated and no serious gaps continued to exist. It was not rash to prophesy that ionization by ultra-violet light would be accepted ultimately as the cause of the great majority of basal and squamous celled epitheliomata of the skin and squamous epitheliomata of the lip in countries like Australia.

They had already driven out the false doctrine that rodent ulcers were never multiple, and that rodent was never preceded by keratosis, and they had routed the "cell nest" theory. But it appeared that they were going to succeed in their constructive efforts as well as in their destructive criticism.

It should be stated positively, however, that basal celled carcinoma did not only arise as a result of ionization by ultra-violet irradiation, but that other causes occasionally produced the lesion, though only in a small minority of the cases occurring in Australia. Dr. Lawrence had always emphasized the desiccation of the skin by the dry atmosphere of Australia as a potential cause of skin epitheliomatosis; but there was, as far as he (Dr. Molesworth) could see, no evidence in favour of this theory, since the skin of the blackfellow or of the dark skinned European was just as susceptible to the desiccating influence of the Australian inland atmosphere as were the fair unpigmented skins of those shown to supply the great majority of their cases of rodent ulcer.

It was true that at the period of epitheliomatosis development there was frequently a condition of dryness of the skin, but that had been shown to be the result of atrophic changes in the skin and its appendages induced by the light effect and comparable with the atrophy produced in skin and appendages by X rays and radium rays, but rodent ulcer was rather more likely to occur in areas richly supplied with sebaceous glands than elsewhere and it must be admitted that such areas were much better able to resist desiccation than areas less well supplied with such glands.

The dryness of the atmosphere did exert an influence upon the production of rodent ulcer and squamous epithelioma, but this was indirect. It was an influence upon the light and not upon the skin. The presence of a large amount of water vapour in the air meant clouds which filtered off all or most of the ultra-violet component of the sun's rays and the absence of cloud meant a light richer in ultra-violet rays and therefore more active in stimulating the sensitive unpigmented skin to epithelioma production.

Nomenclature was, of course, a rock upon which many agreements were wrecked, but he wished to testify that keratosis was to his mind merely the first evidence in most cases of epitheliomatous activity and could be proved on section to be so in many instances. Therefore, what Dr. Lawrence called a triad or a trinity Dr. Molesworth preferred to designate as a unity and to call it epitheliomatosis, but what was there in a name?

Dr. Molesworth then referred to measures which it was desirable to undertake in order to diminish the very serious loss of life and efficiency due to rodent ulcer and squamous epithelioma of the skin and lip in Australia. Preventive measures stood first. The public must be taught that a much wider brimmed hat should be worn in the country districts than was in vogue. This especially applied to the red haired individual and to freckled folk, who were not infrequently dark haired. This could be achieved in various ways. If public bodies were convinced of the reality of the danger, they could instil systematically through the press the doctrine that over exposure to the sun was dangerous and could advocate the sombrero in the bush.

For the medical profession there remained the slower method of seeing that no student who might later on become a medical practitioner in the country, failed to appreciate the damaging effect of chronic sunburn, so that later on all the men trained in Australian schools would act as missionaries, teaching this doctrine in their towns and districts. "Teach, teach, teach" should be their slogan. Teach the students how epitheliomatosis was caused; teach them to recognize it in the keratotic stage and that it was much easier to cure in this stage than in the developed stage. Students were liable to think a dermatologist fussy when he insisted on immediate treatment in the keratotic stage, but judicious use of the developed condition as a demonstration of the necessity for treatment in the preliminary stage would soon counteract that impression.

The occasional case of a rodent ulcer or epithelioma destroying the eye, the face and in the process of destroying the life of a patient was very valuable if the lesson to be derived from it was properly hammered into the class before which the patient was demonstrated. It was a public duty to teach this doctrine, for epitheliomatosis was a common and deadly disease in Australia, much more so than many other conditions to which public attention was constantly drawn and to a large extent it was preventible. Since they knew the cause of a large majority of such conditions, it was their bounden duty to teach the public, at least through the student and the country medical practitioner, how to prevent it.

As to treatment, it should be an axiom that all such conditions should be recognized and treated (as they could be) in the keratotic or at least in the early stages. A couple of doses of X rays or radium would as a rule completely and permanently eradicate these lesions and prevent the horrible effects of the developed tumours. It was their duty then again to teach the students both the necessity for diagnosis of the preliminary or early stages and the method of treatment best adapted to produce a cure, not only of the developed rodent ulcer or epithelioma, but, what was more important still, of the keratotic stage. Thus the whole problem, preventive and therapeutic, as far as it affected them as medical men, was one of teaching.

Again referring to the nomenclature Dr. Molesworth objected to the term senile keratosis. These lesions often appeared in old age, but not because of old age, but because of the sum total of stimulant effects which determined these conditions. So-called senile keratoses were usually solar keratoses and so-called senile warts bore no relation to keratosis. *Xeroderma pigmentosum* was not reported in Australia, probably because it appeared to be a familial condition. Question had been raised as to the pathogenicity of *demodex folliculorum*. Dr. Molesworth doubted the share of demodex in causing irritation leading to cancer. He doubted the practicability of limiting the immigration to Australia of fair and red haired labourers for tropical areas. He concluded by expressing his thanks for and appreciation of Dr. Lawrence's paper.

DR. C. G. CROWLEY expressed his appreciation of Dr. Lawrence's paper and his thanks to Dr. Molesworth for so ably opening the discussion.

According to European authorities *xeroderma pigmentosum* was due to sunlight and not to a familial factor. Dr. Crowley had seen a child with *xeroderma pigmentosum* who had atrophy of the skin, keratoses and epitheliomata. If *xeroderma pigmentosum* were due to sunlight, he thought it would be more common in Australia and less so in Europe, whereas the reverse was the case.

The condition of recurrent summer eruption had not been mentioned that evening. Donald Hutchinson had described a vesicular eruption, occurring on exposed parts

in patients seen in England and leaving scars. Dr. Crowley had seen only one such instance in Australia and yet the European authorities maintained that this condition also was due to sunlight.

Not much had been said that evening about the treatment of the conditions under discussion. He had yet to see the rodent ulcer which had penetrated deeply into bone or cartilage cured by any method, even surgery. Six or nine months afterwards the patient almost always came back with a recurrence. Radium controlled but did not cure such growths and what surgery would cure, radium also would cure. What would happen, Dr. Crowley asked, in twenty or thirty years' time to those bronzed, constant surf bathers so common on the beaches in Sydney? He had found that the epithelial triad was not so common in California as in the Colorado district, where the conditions were similar to those in Central Australia.

DR. H. FLECKER said he had been very interested in the paper and in the remarks of Dr. Molesworth in making more intelligible the phenomena of the epithelial triad. He wished to lay stress on the necessity of following up patients after treatment. In a proportion of cases the conditions recurred whatever the treatment. In many instances a patient had an insignificant ulcer which apparently disappeared under treatment, and was forgotten, but later recurred and on the second occasion was likely to be more difficult to treat. He referred to the irregular distribution of keratoses in many instances, of various sizes and in various situations and with ill-defined edges. Should only the most prominent patches or all the lesions be treated? One area might clear up, while another formed elsewhere.

Referring to Dr. Crowley's experience of unsatisfactory results in treatment of rodent ulcer involving cartilage and bone, Dr. Flecker had demonstrated several such patients in whom there had been extensive rodent ulcer of the nasal cartilage and of the eyelids which had cleared up under deep X ray therapy and had remained healed for three years. It was too soon to say whether the cure had been permanent.

DR. H. N. FEATONBY said that the discussion was of interest from the preventive point of view. He thought that judicious propaganda would bear good fruit in the prevention of the epithelial conditions under review. People with the sensitive type of skin should be warned that exposure to sunlight was more or less dangerous. Heliotherapy might also be dangerous. Publicity could be given to this danger with the sanction of dermatologists and the warning could be included in the films and propaganda of the Better Farming Train. Dr. Featonby had been pleased by the results already obtained by advice given over the wireless on public health matters and it was being realized that education was one of the main duties of the health officer.

DR. K. G. COLQUHOUN said that the patient of his mentioned by Dr. Lawrence and Dr. Molesworth, with keratoses following prolonged ultra-violet light therapy administered by a layman, supplied the link giving direct evidence of the action of ultra-violet light with a long incubation period of twelve months or longer. The effect was apparently a cumulative one. This patient had deposited pigment easily, suggesting a similar danger to people who freckled easily. Dr. Colquhoun had thought that the pigmentation had been an effort to combat the ultra-violet action, but in Dr. Molesworth's view it probably was an additional warning.

DR. STANLEY SHIELDS said that in addition to warning adults, children should be warned that they should wear wide brimmed hats in the summer time.

DR. J. NEWMAN MORRIS said that he had been much impressed by the paper and the varied interest of the questions raised. A comparison of the climates of Melbourne and Sydney showed that there were eight hours per month more sunlight in Melbourne than in Sydney.

He had been glad to hear Dr. Featonby discuss the matter from the preventive point of view. The Branch would gladly supply authoritative statements for promulgation by the Public Health Department, if requested to do so. The ætiology of the keratoses and of the allied conditions was chiefly a matter for the dermatologists, but their treatment was a matter of general interest and importance. Treatment by radium was not always satisfactory. Surgeons had referred to them patients for whom radium had been tried, but had not been successful. Broders in Rochester had established that as many cases of epithelioma of the lip occurred in non-smokers as in smokers.

The supply of radium at the Saint Vincent's Hospital was at present inadequate for the treatment of all patients. A man whom he had recently seen there with epithelioma of the lip had had metastases in the submaxillary lymphatic glands and such an example might refute the statement sometimes made that the patients of dermatologists never died. Dr. Morris concluded by thanking Dr. Molesworth for his visit and for his valuable contribution to the discussion.

DR. HERMAN LAWRENCE, in reply, said that on behalf of the members of the Victorian Dermatological Society he wished to thank Dr. Molesworth for his kindness and enthusiasm in coming from Sydney to attend the clinical meeting held at the Melbourne Hospital that afternoon. His extensive knowledge of skin diseases was of great value in helping to solve some of the dermatological conundrums presented at that meeting. He also wished to thank Dr. Molesworth for accepting the invitation of the Branch to open the discussion upon the paper. Dr. Lawrence agreed with Dr. Molesworth that the term *senilis* in connexion with keratosis might be dropped, as all cases of *keratosis senilis* were probably due to sun's rays irritation. The *keratoses solares* as at present understood, occurred early in life, due to the fact that the person so affected was hypersensitive to the sun's rays or that the climatic conditions were such that they favoured the development of keratoses in comparatively young persons. The *keratoses seniles* were really *keratoses solares*, occurring in persons in whom climatic conditions did not favour their earlier development.

Featonby say that the health authorities would be willing to do something in the way of propaganda in order to get persons to recognize the importance of having treatment for the early conditions in connexion with skin cancer. As regards males and females he found many more males affected by keratoses and rodent ulcers, probably outdoor occupation helping to bring about this condition.

The *moulages* of epithelioma of the hand showed the advanced stage which persons allowed these condition to reach before seeking medical advice.

If these two patients who were both over seventy years of age, had sought treatment for the early lesions (probably *keratoses solares*), they would most likely have been cured.

Correspondence.

THE DIARRHŒAS OF INFANCY.

SIR: These disorders form such a large part of medical practice and contribute so largely to infant mortality that any discussion of their prevention or treatment is of great practical interest. On both these matters we have some, but still too little, precise scientific knowledge, but depend to a large extent, as Dr. Laurie has shown, on general impressions derived from personal experience. Such personal impressions are open to fallacy and can never be demonstrative, but where they are based on a wide experience, as in Dr. Laurie's case, they should always be treated with respect. On most of the points made in Dr. Laurie's article I am in agreement with him, but in some my personal impressions, also based on a considerable experience, are at variance with his. Perhaps he will excuse my referring to some of them, as they happen to be points on which he has expressed himself with some emphasis.

That in all cases of infective disease the resistance of the patient must receive as much attention as the virulence of the infection is generally acknowledged and few, if any, would deny that a well-nourished infant on a well-balanced diet is thereby less likely to succumb to or perhaps even

to contract an infective diarrhœa. But the causes of immunity and susceptibility are complex and obscure and we as yet know them very imperfectly. When Dr. Laurie says: "it cannot be too often or too vehemently emphasized that the diet and the state of the child are of far more importance than the nature of the causative bacilli," I think he goes too far. I call to mind cases in which there appeared to have been nothing wrong in the two former conditions and yet a virulent infection was not averted. I would not assert the contrary of Dr. Laurie's proposition; I would merely demur that his contention is not proven.

In all ordinary cases of diarrhœa I agree with Dr. Laurie as to the value of a dose of castor oil and am not at all perturbed that "Abt has repeatedly protested against the initial purgative." I go further. Though I frequently order no drugs of any kind, if I do order any, it is usually small doses of castor oil emulsion. My general impression is that this is almost always harmless and may be sometimes useful. It may, of course, be continued too long and needlessly prolong the looseness of the motions, though sometimes under these circumstances mothers have complained of its constipating effects. I also agree with him as to the importance of stopping all food for at least twenty-four hours. I substitute thin barley water, very slightly sweetened, having learnt the importance of very small quantities of carbohydrate, after having seen a few cases die of acidosis with hyperpnœa on a diet of water alone. On the other hand, I differ from him when he emphatically endorses "Abt's protest against the use of magnesium or sodium sulphate in the so-called dysentery of children." I protest against the epithet "so-called" prefixed to dysentery and I protest against the condemnation of a method of treatment which I regard as one of the certainties (such as they are) of therapeutics. I do not, of course, claim that it will save every case of overwhelming infection, nor would I depreciate the possibilities of antidysenteric serum, when given early. But having experimented with many drugs with most disappointing results, I have found the saline treatment of infantile dysentery so superior that I deplore the fact that it is not used universally. Dr. Laurie's treatment with minute doses of calomel frequently repeated was my own routine for many years, but I have long discarded it, except in cases of persistent vomiting, where it may be of some small value. I would like to make it clear that sulphates of soda and magnesia are quite useless in dysentery, unless given in sufficient dosage to produce their characteristic effect. I inform the mother that the medicine is intended to make the motions watery and not slimy. This insures the cessation of tenesmus and nearly always a lessening of toxæmia. Doses of ten, fifteen and twenty grains of each drug every three hours may be necessary. Having produced this change, I halve the dose and may continue it at that for a few days. I might discourse—learnedly or otherwise—as to the rationale of this treatment, but that would too much prolong this letter. As to diet I endeavour as soon as possible to substitute whey (made with rennet) and in older infants such foods as water-sago or arrowroot and baked bread. The return to a milk diet is made at a later stage very gradually and cautiously.

Yours, etc.,

A. JEFFERIS TURNER.

Brisbane, September 13, 1928.

OTOMYCOSIS.

SIR: Frequently reminded serves to impress the memory and thus I excuse the repetition of a type of case from time to time reported in the journals.

Mrs. C., from Bourke, was sent to me complaining of a sensation of a foreign body in the throat with slight cough on and off for several years; there was no actual sore throat.

Examination revealed no other abnormalities than slight hypertrophy of the lingual tonsil which rapidly receded to normal with local treatment; her symptoms, however, persisted and as she reported slight deafness, I syringed waxy matter from the ears with prompt relief of the throat sensations. Two days later she returned with some soreness of the right ear and on inspection I was able to see small whitish dots here and there on a reddened skin; in spite of antiseptic measures these rapidly grew until in three days the external meatus was filled with a membranous material and she again had the sensation in the throat of a foreign body. It was with much difficulty that the ear was cleansed and again with relief of the throat trouble.

The case is reported as an example of referred pharyngeal sensations from pathological states in the ear; such instances are by no means rare and the symptoms range from slight paræsthesia to persistent coughing or less rarely motor phenomena such as palatal tic. Local pathological changes in the throat result from the irritation of the dry cough thus setting up in time chronic laryngitis and even bronchitis and such cases have been suspected as possible tuberculosis, only to recover after years of coughing *et cetera* when the ears were syringed.

The path of this reflex is believed to be by way of the small auricular branch of the vagus nerve which pierces the temporal bone through the jugular fossa to supply portion of the middle ear and the external meatus.

Of further interest in this case is the otomycosis itself; the fungus was of unusually rapid growth, filling the external meatus in three days. At first I thought the flaky patches were desquamated epithelium, but under the microscope they proved to be entirely mycelial with a few leucocytes.

The treatment apart from cleansing is not always easy, as the fungus is at times very resistant. I have found, as in this case, that syringing with a warm biniodide lotion (1 in 4,000) done whenever the fungus tends to accumulate, followed by drying, thence spirit and peroxide drops, usually clears the trouble up in a short time. The patient should, however, continue to use *unguentum hydrargyri oxidi flavi* night and morning for the next two weeks.

It has been a striking fact in many cases referred to me from the western districts of New South Wales that otomycosis is extremely common in people from those parts.

Yours, etc.,

DOUGLAS CARRUTHERS, M.B., Ch.M.

223, Macquarie Street, Sydney.
September 20, 1928.

Proceedings of the Australian Medical Boards.

TASMANIA.

THE undermentioned has been registered under the provisions of *The Medical Act*, 1918, of Tasmania, as a duly qualified medical practitioner:

Tarleton, John Willington, M.B., 1902 (Univ. Sydney), New Norfolk.

QUEENSLAND.

THE undermentioned have been registered under the provisions of *The Medical Act of* 1925, of Queensland, as duly qualified medical practitioners:

Caselberg, Alexander Lionel, M.B., B.S., 1921 (Univ. New Zealand), Barcaldine.

Barr-David, Joseph Schwartz, M.B., B.S., 1923 (Univ. Melbourne), Thursday Island.

Deane, Maslen Mackenzie, M.B., B.S., 1926 (Univ. Melbourne), Brisbane.

Pitt, Ethel Kathleen, M.B., B.S., 1922 (Univ. Melbourne), Brisbane.

Restoration to the Register:

Dive, Walter Henry, M.B., Ch.M., 1924 (Univ. Sydney), Killarney.

Registration of additional qualification:

Wiburd, Carvosso Roy, D.P.H., 1928 (Univ. Sydney), Townsville.

Obituary.

WALTER ANDREW LUKE.

WE regret to announce the death of Dr. Walter Andrew Luke which occurred at Omeo, Victoria, on September 19, 1928.

Books Received.

PRESCRIBING OCCUPATIONAL THERAPY, by William Rush Dunton, Jr.; 1928. Springfield: Charles C. Thomas. Crown 8vo., pp. 143. Price: $2.10 net.

INCOMPATIBILITY IN PRESCRIPTIONS, by Santosh Kumar Mukherji, M.B.; 1928. Calcutta: Rai Saheb B. N. Mukherji and Son. Crown 8vo., pp. 130.

RECENT ADVANCES IN SURGERY, by W. Heneage Ogilvie, M.A., M.D., M.Ch. (Oxon.), F.R.C.S. (England); 1928. London: J. and A. Churchill. Demy 8vo., pp. 468, with illustrations. Price: 15s. net.

LOCAL ANESTHESIA: A SHORT COURSE FOR STUDENTS AND SURGEONS, by Géza de Takáts, M.D., M.S., with a foreword by Allen B. Kanavel, A.B., M.D., D.Sc.; 1928. Philadelphia: W. B. Saunders Company; Melbourne: James Little. Royal 8vo., pp. 221, with illustrations. Price: 18s. net.

BAILLIÈRE'S SYNTHETIC ANATOMY, by J. E. Cheesman; Part IXa: Pterygo-Maxillary Region; 1928. London: Baillière, Tindall and Cox. Crown 4to., pp. 6. Price: 2s. 6d. net.

Diary for the Month.

SEPT. 29.—Eastern District Medical Association, New South Wales.
OCT. 2.—New South Wales Branch, B.M.A.: Council (Quarterly).
OCT. 2.—Tasmanian Branch, B.M.A.: Council.
OCT. 3.—Victorian Branch, B.M.A.: Branch.
OCT. 3.—Western Australian Branch, B.M.A.: Council.
OCT. 4.—South Australian Branch, B.M.A.: Council.
OCT. 5.—Queensland Branch, B.M.A.: Branch.
OCT. 5.—New South Wales Branch, B.M.A.: Delegates of Local Associations Meet Council (First Day).
OCT. 6.—New South Wales Branch, B.M.A.: Delegates of Local Associations Meet Council (Second Day).
OCT. 9.—Tasmanian Branch, B.M.A.: Branch.
OCT. 9.—New South Wales Branch, B.M.A.: Ethics Committee.
OCT. 11.—Victorian Branch, B.M.A.: Council.
OCT. 11.—New South Wales Branch, B.M.A.: Clinical Meeting.
OCT. 12.—Queensland Branch, B.M.A.: Council.
OCT. 15.—New South Wales Branch, B.M.A.: Organization and Science Committee.

Medical Appointments.

Dr. Horace Rowland Guest Barrett (B.M.A.) has been appointed Senior Assistant Medical Superintendent, Hospital for the Insane, Goodna, Queensland.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser," page xviii.

CHILDREN'S HOSPITAL, CARLTON, VICTORIA: Honorary Medical Officer.

RENWICK HOSPITAL FOR INFANTS, SUMMER HILL: Resident Medical Officer.

ROYAL NORTH SHORE HOSPITAL OF SYDNEY: Honorary Clinical Assistant.

THE ADELAIDE CHILDREN'S HOSPITAL, INCORPORATED: Honorary Surgeon to Out-Patients.

THE BRISBANE AND SOUTH COAST HOSPITALS BOARD: Honorary Orthopædic Surgeon.

THE TOWNSVILLE HOSPITALS' BOARD: Medical Superintendent.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 30 - 34, Elizabeth Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. Marrickville United Friendly Societies' Dispensary. People's Prudential Benefit Society. Phœnix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
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